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MAY 11, 1953

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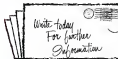


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4-stage
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REX-FLEX
STAINLESS STEEL HOSE
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Aviation fuel lines



Aviation fuel lines



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Aviation fuel lines



Aviation fuel lines



Aviation fuel lines



Aviation fuel lines

NEWS DIGEST

Domestic

Speculation has arisen that Lockheed Aircraft Corp.'s participation in the purchase of Howard Hughes' large jetliner accounts may have hit a snag, although there is no indication that negotiations have broken off. Two weeks ago several Lockheed officials appeared confident that a deal was only a matter of time. However, a Hughes spokesman told *Aircraft Week*, 30 days ago, "there is no deal with Lockheed," and at a Lockheed stockholders' meeting last week, president Robert E. Goetz is reported to have declared, "We have no deal with Hughes Aircraft." Meanwhile, morale on all levels at Hughes Aircraft is reported suffering because of company's uncertain status.

Significant relief landed down last week by U. S. Judge Matthew F. McGone held the federal government is responsible partly with Eastern Air Lines in the 1949 collision of a DC-3 with a Bellanca P-38 over Washington National Airport, most close the cost of \$10,815 million in claims filed by families of 15 persons killed in the crash.

Strong congressional opposition is developing to an airline industry reorganization plan that would shift annual pay from Post Office to CAB expenditures. Rep. John McFall, Sen. John Kennedy and other congressmen want the change accomplished by direct legislation, using up a non-plus-minority-point yardstick for road rates and making carriers that do not fly until eligible for subsidy.

New Air Force training device for bombards, navigation and radar operation in emergency, high-altitude aircraft has been developed by American Machine & Foundry Co.'s Electronic Division, Boston, under inspection of Air Research and Development Command.

Douglas Aircraft Co., Santa Monica, Calif., has delivered the first of three DC-8s ordered by Transperu. Service between Lima, Peru, into Europe cases, leading to 26 the number of airlines with DC-8 equipment in operation on or on order.

First Convair 440 of three ordered by Alaska, Idaho airline, took off from San Diego this month on a delivery flight to Reno via New York, New Bedford, London, Scotland and Paris.

More than 1,500 AF veterans and personnel, airline and aircraft industry



FRED R. LEE (right) is now in as new Administrator of Civil Aeronautics by Secretary of Commerce Harold W. Holt. Also present at the ceremony was Oliver G.

officials are expected to attend the Air Force Assn.'s seventh annual convention Aug. 20-22 at Washington, D. C.

Mr. J. Shale Nook, who set an official world speed record of 685.5 mph. in an F-86J, was awarded a "distinguished membership" in the Jet Propulsion Assn. at its annual meeting Aug. 30 in Lynn, Mass. The Air Force's "exceptional service award" was awarded posthumously to the late D. F. Warner, General Electric engineer who developed the first U.S. jet engine.

Financial

Curtis-Wright Corp., Wood Ridge, N. J., reports consolidated net profit after taxes totaling \$1,945,642 for the first quarter of this year, compared with net earnings of \$1,766,144 for the same period in 1952. Sales were \$96,762,362, compared with \$67,621,115 last year. Backlog Mar. 31 totaled more than \$1 billion.

McDonnell Aircraft Corp., St. Louis, reports \$2,728,827 net earnings from sales totaling \$94,715,321 for the first quarter of 1953, more than doubling the \$167,781 reported for the same period in 1952. Sales for the quarter totaled \$15,905,790, a 44% increase over last year. Backlog a \$414 million.

Boeing Aircraft Corp., Bellevue, N. Y., had a net profit of \$565,697 for the first quarter of 1953, more than doubling the \$167,781 reported for the same period in 1952. Sales for the quarter totaled \$15,905,790, a 44% increase over last year. Backlog a \$414 million.

West, Commerce Dept. director of personnel management. Lee previously had served as Acting Administrator of Civil Aeronautics.

American Airlines net profit for the quarter ending Mar. 31 totaled \$1,889,306, compared with \$844,434 last year. However, for the period year \$44,501,000.

Boeing Aircraft Corp., Wichita, reports net income for the first half of 1953 of \$764,701 and sales \$48,151,390, compared with \$651,927 in profit and sales amounting to \$16,920,000 during the same six-month period of 1952. Backlog Aug. 29 was \$115.5 million.

Trans World Airlines profit reverses for the first quarter of 1953 closed to a record \$78,556,497. Net loss for the quarter was \$1,525,191 compared with a loss of \$1,405,476 for the first quarter last year.

Northeast Airlines \$1,768,337 net profit last year was due almost entirely to a gain of \$1,785,978 from the sale of Martin 2-2-2, industry shows report.

McDonnell Aircraft Co., Van Nuys, Calif., reports net income after taxes last year of \$106,782 from sales totaling \$6,946,080, a 67% increase over 1951.

International

Air traffic transactions handled by the International Air Transport Association, located in February 1953, \$15,440,000, compared with \$14,832,000 during the same month last year.



G.E. Salutes Armed Forces With Jet Power for Peace

During a half century in which men fought up with and exceeded the speed of sound, General Electric has been an integral part of aviation. From G.E. drawing boards and production lines have come many significant contributions to the progress of aviation. Now, on Armed Forces Day, 1955, production for peace has made G.E. one of the world's largest manufacturers of jet engines.

Simultaneously, General Electric's vast research, design and development facilities are steadily probing into the vast unknown areas of jet propulsion. And a world-wide service engineering organization assures G.E. powerplants peak performance—no matter where they may be.

In the future, as during the past fifty years, G.E. will continue to power and produce for aviation. General Electric Co., Boston 230-15, Subsidiary 5, N. Y.

G-E J47 jet engines power all of these planes



NORTH AMERICAN F-100, built 470 G-E J47s record



REPUBLIC F-84F, world's fastest piston bomber, the jet



NORTH AMERICAN F-86, achieving 800 in Korea



NORTH AMERICAN F-46, operational jet bomber



HAWTORN 33-51, jet-powered tactical bomber



REPUBLIC F-84F, high-speed interceptor



CONVAIR F-106, high-speed bomber



NORTH AMERICAN F-4B, new Navy fighter

You can put your confidence in...

GENERAL ELECTRIC

WHO'S WHERE

In the Front Office

Frank E. By, Jr., former Secretary of the Army, has been elected executive vice president and a director of General Dynamics Corp., New York majority stockholder of Consolidated Vultee and owner of Cadillac Ltd.

Julius Ewing is new president of American Aircraft Corp., Teterboro, N. J., succeeding the late Peter Ewing. Other new executives are: **Morris Jaffe**, vice president; **James J. Johnston**, treasurer; and **Gene De Los Angeles**, secretary.

William C. Jordan, former president of Curtis Wright Corp., has been named as appointed executive vice president and general manager of Hiller Helicopters, Palo Alto, Calif.

Chas. Donaldson has been named president of East Coast Aircrafts, Inc., Fort Worth, Texas.

Edward J. Healey has joined Fairchild Aviation Corp., Los Angeles, as vice president of engineering.

Leslie E. Lewis, vice president of Westinghouse Electric Corp., New York, is new manager of the Aviation Gas Turbine Division.

Franklin L. Snyder has been named to the staff of R. E. Robinson, executive vice president, Defense Products Division.

Paul Winkler has been appointed vice president of Rediff & McKinnon, Inc., Los Angeles.

Changes

Carl S. Allen has been appointed special assistant to the president of Glenn & Wain Co., Baltimore. **Lorenson E. Glen** has joined the firm's legal staff.

Robert R. Williams has been named director of Aircraft Motors, Inc., Syracuse, N. Y.

James F. Kegan is general manager of the new Seltek Division, Standard Aircraft Div. Co., Indianapolis, Ind.

Robert E. McDonald has joined Engineering Research Associates Division of Remington Rand, Inc., St. Paul, as senior technical director.

William Lardie has been named controller of Aero-Tek Products Co., Hawthorne, N. J.

J. Walter Collins is new manager of general aviation to the Communications Division of Texaco Refining Division. Other changes: **Harold M. Black**, chief assistant to the general manager; and **Charles L. Ray**, staff assistant to the general sales manager; and **Ernest E. Biele**, aviation sales engineer.

Honors and Elections

E. Merrill Anderson, Middleboro, Mass., has been elected president of American Turbine Society. Also elected are: **Maxwell W. Bullock**, Tulsa, Okla., vice president; and **Wayne Wendland**, Woburn, D. C., secretary-treasurer.

INDUSTRY OBSERVER

Republic Aviation's sweeping Thunderbolt (B-47) is the latest US jet fighter to give out the word of war. Long before the word has been heard, the Republic test pilots report the new fighter shows good combat characteristics as it slides into some speed.

British reports that the first U. S.-built Canberra has flown are wrong. **Glenn E. Martin Co.** reports the first Martin-built Canberra is now scheduled to make its first flight late in the summer. Original schedule called for delivery to USAF this spring.

Convair has been experimenting with specially designed turbine turbines on the exhaust stacks of a Convair 440. Initial experiments indicated an overall exhaust noise reduction of 10 to 15 decibels. Convair now plans further tests on United Air Lines 740s to get passenger reaction.

North American board chairman J. H. "Dutch" Knudsen reports that NAA has developed a fuel pump for a rocket motor that delivers 1,700 hp at top to supply fuel to the rocket burner.

North American's latest model Sabre (F-86H) aerial flight test at Edwards Air Force Base was postponed for approximately a week due to problems with the General Electric J73 jet engine.

Convair reports from Korea indicate that glowing tailpipes of jet fighters make excellent targets at night. Marine jet fighters from the Douglas F4D twister Mustangs report they were able to see clearly the enemy jet tailpipes before opening fire, even though initial contact and tracking up to firing range was done on airborne radar.

Naval is currently evaluating the Westinghouse Electric Corp. inter-upter for control system used on the McDonnell F2H-3 and the Hughes Aircraft system used on the F2H-4. The Hughes equipment is similar to that on the F-8SD, F-8HD and F-8HC and slated for the F-8E-300.

McDonnell Aircraft is now delivering F2H-3 Bandsters to Navy training units, and the larger, longer ranged jet fighter is expected to appear soon in Korean combat. Despite original F2H-3 design for land to be carried internally, Navy plans to add options to increase range.

Boeing Transport Commercial pilots report to bring two de Havilland Comet 1A jet jet transport across the Atlantic under May 15, after completing four-hour flights with B-707 crews in Britain.

Vickers has dropped the designation VC7 for its new jet transport design scheduled to be powered with Rolls-Royce Conquest turbo engines because of its similarity to Boeing's Model 707 designation for its jet transport-tanker project. Vickers will call its jet transport the Vickers 1000 until it receives an official Ministry of Supply name.

USAF has revealed that Republic's F-84C Thunderjet is capable of carrying a pair of "holy" atomic bombs (now extremely under the wings) North American's B-45 multi-jet Tornado bomber also has dropped low atomic bombs during tests over Nevada. During the second atomic tests USAF has a dozen Convair F-106s piloted by Chuck Strange. Air Command had crews over the exploding bombs to ascertain those to shock and burn characteristics likely to be encountered in making atomic attacks.

Frederick Fisher, Inc., Tarrytown, N. Y., now is devoting its major effort to advanced research and development on gas turbine engines for the Allison Division of General Motors Corp. Fisher also is doing some jet engine development work for the Curtiss-Wright Corp., and basic jet research for USAF.

Leet, Inc. has developed a new technique for preventing formation of ice on aircraft windshields, wings and empennage. Company will consider details of the system a trade secret.

No Target Date?

Some defense leaders on Capitol Hill are puzzled by the President's plan to cut out a "target date" in the defense budget.

They say goals in force levels and a date for their achievement must be set before military leaders can proceed to draw up annual programs.

The target date given Congress a yardstick to measure defense programs—creating a spending cap in the winter of 1970, and a showdown last year—from 1954 to 1950 for the achievement of a 143 wing Air Force.

Air Power Advocate

SHAPE's Chief of Staff, Gen. Alfred Guenzler, reportedly favored by the President to step in as chairman of the Joint Chiefs of Staff when Gen. Doug Bunker Steinhilber steps out August, is strong foe or power. Outlining policy for America's defense, he observed to senators: "Part of it, as power is a disadvantage."

The strike against Guenzler for the appointment is that he is an Army man, and there is widespread support for a civilian to replace him. The strike against the Navy, senior in USAF, next in line. The strike against Army Airpower, other top project, is his reputation for Navy participation.

Budget: When?

The military services probably will be kept on tenterhooks waiting on money for fiscal 1994.

Despite news that the new Administration's budget will be sent to Congress in mid-July, it is expected to postpone about \$36 billion in new money, \$5 billion less than the \$41 billion proposed in the Treasury budget.

It usually takes Congress at least six months to run the budget on the large defense budget. Hearings on this 1993 fiscal budget started Jan. 10 of last year, complete after an extension to March 10, and July 10, before it finally was signed. The 1993 fiscal budget, which was to Congress Aug. 30, wasn't signed until Oct. 15.

If Congress takes the standard time, it will not be until November before the 1994 fiscal budget is finally approved. Further commitments are made to carry on military activities when the budget isn't enacted by the start of the fiscal year. But the account held back on interest letting during the period.

Congress' determination to approve early this year, by July or August if possible, will be a spur to speed action.

Weapons Systems Review?

The reevaluation of current production by the new administration of Senate Armed Services Committee may lead into a review of the roles and missions of the services and the selection of weapons to implement them. That is inherent in the committee that the services are coming in overlapping and conflicting decisions in the development and production of weapons, particularly in the aircraft and guided missile fields.

Some members of the committee are likely to be reviewed, more closely selected, and weapons strictly confined to fulfilling these roles and missions. The subcommittee is headed by Sen. Sikes Bridges (New Mexico, Week 4, p. 13).

Letup in USAF Contracting

There has been a big letup in USAF contract letting for aircraft and related procurement since the new Administration took over.

• **Omigraphics** averaged only \$145 million a month between March, assigned with \$2.2 billion a month for the July through December, 1992, period.

• **USAF** will have to step up obligating to the \$1.2 billion a month rate for the April through June period, if it is to cut up all the \$12 billion available for the current 1993 fiscal year before it ends July 1.

Navy has been obligating its aircraft and related procurement funds at a high rate, however—\$239 million a month between March. This leaves only \$163 million a month available for the following three months. Dependence for aircraft and related procurement, making of progress on production modernization, have been at a high rate. Transmuting Administration's estimate of a \$7.4 billion expenditure by USAF and Navy for the 1994 fiscal year, submitted to Congress in January, probably will be increased.

• **Spending** by the two services over the first nine months, through March, totaled \$5.9 billion—an average of \$655 million a month.

• **It increased** to \$722 million a month between March and April. If this rate keeps up—and, it is expected to—until the 1994 fiscal expenditure for aircraft and related procurement will reach \$5 billion.

27 Defense Secretaries?

The President's Defense Department re-organization plan involving an more consistent structure and bringing the budget to 27 war rate into opposition on both sides of the Capitol.

• **On the House side**, Speaker Joseph Martin, noted the plan to the Congressional Operations Committee, asserting possible opposition in the Armed Services Committee, which has been divided of view. The Secretary of Defense has much authority. Armed Services Committee, however, may fight the plan when it reaches the floor.

• **On the Senate side**, the plan was sent to the Armed Services Committee, which has been along with Administration recommendations in recent years. But the report there is opposition in the committee to the Transmuting proposal.

Changes are the plan will be approved, though, since it takes a constitutional majority—not just a majority of members present—to veto it.

User Charges: When?

Consensus Department's recommendations on user charges for federally financed transportation facilities, including airports, aren't likely to reach Congress before mid-July, and may be delayed before the session for action. The preliminary report went to Undersecretary for Transportation Robert Mayne for working last week.

Committee's study on identification of (federal) aid to various types of transportation, temporarily suspended, will have to be developed further before an explicit final plan on user charges can be worked out.

—Katherine Johnson

Top-to-Bottom Shakeup . . .

Reshuffles 7 CAA Regional Offices Into 4

• **Consolidation will cut overhead \$1.5 million.**

• **Goal is to preserve only essential air services.**

By Alexander McNair

Freeing relations of thousands of Civil Aviation Administration personnel plus direct elimination of several hundred CAA jobs are scheduled before June 30.

These moves are forecast from the latest reorganization of CAA regional offices announced last week by administrator Fred R. Lee as a part of the new Administration's program to cut federal government expenditures.

The CAA regional consolidation will save more than \$1.5 million a year in overhead, Lee said, yet greatly reducing essential services to civil and military aviation and the public.

Main details of the large-scale reorganization include:

• **Shedding** by June 30 of three of the present administrative CAA regional offices, and consolidation into the four remaining offices.

• **Severe reduction** in the Washington Civil Aviation Administration offices at Atlanta, Chicago and Seattle, with of former regional headquarters. New regional offices were down to equalize the workload in each division as nearly as possible in population and geographical size.

• **Open Season**—New CAA jobs are processed for those administrators who no longer will have positions to administer. William M. Ralston, Atlanta; George V. Chiswick, New York; and Richard L. Smith, Seattle. All held high Civil Service security in the CAA hierarchy.

These moves open season on high jobs in CAA's Washington office, at the CAA research center at Indianapolis, the flight center at Oklahoma City, and the airport office.

In Washington, there will be little change in administrator Lee's security



NEW CAA REGIONS. (1) New York (2) Fort Worth (3) Kansas City (4) Los Angeles

• **Kansas City, Mo.** Leonard Jordan, includes North Dakota, South Dakota, Nebraska, Kansas, Missouri, Iowa, Minnesota, Michigan, Wisconsin, Illinois and Indiana.

• **Los Angeles.** Joseph Maxwell, includes California, Oregon, Washington, Montana, Idaho, Nevada, Arizona, Utah, Wyoming, Colorado, and New Mexico.

• **Seattle-Fort Worth** staff will continue in district CAA offices at Atlanta, Chicago and Seattle, with of former regional headquarters. New regional offices were down to equalize the workload in each division as nearly as possible in population and geographical size.

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and administrative staff. But there is no plan for a new deputy administrator to fill the place vacated when Lee moved up to his present post.

In CAA headquarters, news was a final a direct but week about what "downside" jobs were "top tier" jobs in the office of Assistant, Aviation Safety, Federal Airways, General Counsel, Personnel, Operations and Methods, Budget, General Services, Aviation Defense Requirements, and Aviation Information.

Most likely interest is that there will be a new director of the sharp, critical Aviation Office, with H. L. Howell scheduled to succeed Philip Moore. Howell has been director of the Washington Airport project at Burke, Va., which appears to be a casualty of the economy program.

• **Aviation Safety**—How much longer James S. Hendrix will stay on is uncertain. He will stay on as director of side operations, with continued functions of a drastic cleanup of the much-criticized CAA as soon as administrator Lee can get around to it.

Changes are that most other directors will stay on, at least for the time being.

• **End Time Target**—Cost of the reorganization is scheduled by Lee is to preserve as much as possible of the best service provided by CAA by cut-

ing administrative jobs and benefits that do not involve any direct service to the fleet. It is done, however, Airways, Another Safety's engineering organization and a strong nucleus of the staffed reports staff will survive at the expense of most other offices.

■ **Long Handedness.** Washington observers say administrator Lee is up against the same handicap that confronted every civil servant at CAA, the blunder of Civil Service job security. In most past reorganizations at CAA, almost all key administrators could do so without loss of employees to equal positions elsewhere and wait for assignment to assume the vacancies.

During time periods of the Washington government's reorganization, the Office of Aviation Safety, in particular, has become a hang-around for many CAA employees, who recognize that it is the most job secure office at CAA. "No reorganization is going to take it out of our hands, and few administrators have the nerve to suggest it," he says.

■ **Invisible Force.** That coming up against the unmovable object of CAA and Federal structure is the unmovable force of a disheveled budget. There will not be as much as in the 1954 budget, so something has to give.

A move to CAA employees may reduce in position standing directly from the consolidation of reports will be lowered to original headquarters offices that are combined.

However, placement rights under Civil Service mean these relatively few senior executives will continue to play in other facilities and offices.

A substantial reduction is planned in field operations of the airport group, and some reductions are scheduled in Washington staffs and in other field organizations.

Only a small percentage of CAA's 16,000 employees will be separated. But employees in positions to be abolished will compete for remaining positions for which they are qualified, whether these positions are filled now or not. In non-reduced positions filled by local appointment, competition will be limited to jobs in the local CAA offices.

New CAA employees will not be hired to fill vacancies during this adjustment period, except for a few positions that cannot be filled by redeployed CAA employees.

Administration of all seven national CAA regions is centralized, but work with administrator Lee over details of the reorganization.

Except for the deleterious effects to be felt throughout the whole CAA organization, no specific plans have been indicated to alter the status of the Alaska and Hawaiian CAA regions or the international regional office at Washington.

New Defense Plan Boosts Civil Control

President Eisenhower's plan for reorganization of the Department of Defense is aimed at strengthening civilian control, achieving economy and improving planning capability by continuing authority to the Secretary of Defense.

In submitting the plan to Congress, the President stated:

"No function in any part of the Department of Defense, or in any of its component agencies, should be performed independent of the direction, authority, and control of the Secretary of Defense. The Secretary is the accountable civilian head of the Department of Defense and, under this law, my principal assistant in all matters relating to the department. I want all to know that he has my full backing in that role."

■ **Board.** A 10-member board, now a part of the Defense Secretary's office, would be changed under the plan and, replaced by its new Assistant Secretaries of Defense with staffs.

Boards that would be abolished: Munitions, Research and Development, Defense Supply Management Agency and the Office of Director of Inventions.

New Assistant Secretaries would be assigned to Research and Development, Applications Engineering, Supply and Logistics, Properties and Institutions, Legislative Affairs and Public and Medical Affairs. The Assistant Secretary for Applications Engineering would be a new civilian position.

The President emphasized that cutting the functions of the boards to Assistant Secretaries would reduce the staff of the Secretary of Defense office by 100.

There are other changes the President plans in defense:

■ **Theater commands** would be directed by the Secretary of Defense, and commanders would report to him through their service secretary. Under the new plan, theater commands are designated by the Joint Chiefs of Staff and commanders report to the Secretary through their chief of staff.

■ **Authority of the chairman of the Joint Chiefs of Staff** would be increased. He would be responsible for managing the director and staff of JCS and selection of staff members would be subject to

his approval. Staff and doctrine are now responsible to JCS as a body. Service of the director also would be subject to approval of the Secretary of Defense.

■ **Participation in strategic planning** would be broadened by participation at conference, advisory and engineering subcommittees of the Office of Secretary of Defense in the staff work of JCS.

■ **Civilian control over military personnel** would be strengthened by having civil officials make efficiency reports on officers devoted to their service. At present, this is done by superior military officers with the result that military personnel sometimes are inclined to minimize their loyalty to their commanding officers.

■ **Establishment of the new Defense Secretary** and the changes in the functioning of JCS are subject to vote by a constitutional majority of either house of Congress within 60 days.

The President also declared that the three service Secretaries are making studies of the internal organization and functioning of their departments with a view to improvement and that a study is underway on military personnel policies, particularly the broad retirement of capable officers.

Pioneer Loses Final 2-0-2 Subsidy Appeal

Civil Aeronautics Board last week rejected Pioneer Air Lines' final appeal for more subsidy, to finance operation of Northwest routes at DC-3s. Four Board members unanimously denied Pioneer's petition for reconsideration of the decision. New member Florence Dray also abstained.

The decision already has prepared to sell the Martin and has been DC-3s. Observers expect such action soon.

CAA strikes its decision awarding \$1,000,000 annual mail pay to Pioneer, yielding \$2.4 million loss. But the Board figures PAA would need to be the bigger Martin for a period of five years.

On the airline's claim that even \$1 million a year will not support adequate DC-3 service on its routes, the CAB denied other states. "Of course, we can not at this time put upon the reliability of Pioneer's claim for a higher DC-3 rate, since the evidence in support of the claim is not in the record and the proper remedy for introduction of such evidence has not been completed."

The Board takes a position that Pioneer's switch to 2-0-2s was a management error.

■ **CAA says.** "Pioneer's action in equipping its fleet with Martin 2-0-2 aircraft did not meet the statutory requirements of economical and efficient management."



HOK-1 ship, showing the new four-place engine in action. Standard water is just going over port side head.



ENGINE in cockpit accessible by opening large overhead doors. Continental 490 hp R775-8 is mounted in 10-day angle.



TWIN BOOM configuration is detailed in this view. Note movable horizontal tail surface. Five wheelbarrow on craft is apparent.

Kaman HOK-1

- First production copter is delivered to Navy.
- Company also shows off turbine-powered K-225.

A spectacular helicopter under development by Kaman Aircraft Corp. plant, Bristle Falls, Western Long, Conn., has met United Navy's new observation/ambulance HOK-1 and marked delivery of the first production model of the copter.

■ **Key.** Mrs. John H. Kaman, Navy Bureau of Aeronautics Assistant Chief for Materials and Stores, accepted the two-ambulance copter from Charles Kaman, head of the marine trucking company. They then and the Kaman employees watched various Kaman helicopters fly in and out of the air.

The HOK-1 is powered by a Continental R775-8, 400-horsepower 490 hp engine and designed to carry four persons, as two later persons plus additional fuel and pilot. Performance data has not been disclosed.

■ **Other Kaman.** Flying with the newest member of the Kaman family were such other craft as the world's first gas-turbine helicopter, a Kaman K-225, which in an latest modification carries no rotor, ducts downward, instead of upward, as amphibious HOK-1 Navy helicopter, fitted with pneumatic floats and capable of landing on land, water, snow or ice, a conventional HOK-1 Navy trainer with dual pilot, and an amphibious K-225 copter, powered with a 725 hp Lycoming piston engine controlled by CAA for civil training and sporting operations.

All the aircraft use the basic Kaman rotor system, which provides side-by-side rotor with retractable blades. Parts of the blades is actuated by small servomotors, auxiliary control surfaces attached at the 3 meters of the rotor blades and moved by the pilot in order to account on dynamic pitch. Fixed tail fin surfaces provide additional stability.

Martin Lists Officer Salaries for 1952

Captain M. Barker, president and president of Martin Co., Martin Co. was paid a salary of \$58,747.50 during 1951, the Baltimore company reported to the Securities & Exchange Commission last week.

■ **Bradford.** Whittier Jr., vice president, received \$58,382.80. George T. Wain, vice president manufacturing, \$57,900, and Glenn L. Martin, honorary chairman, \$51,955.



DOMAN YH31, main cockpit cab and cargo door, taken to the air for the first time

Doman Producing New Helicopter

Doman Helicopters flew its first production helicopter, the four-blade YH-31 evacuation helicopter, for the Army Ground Force at Dunsburg, Conn., Apr. 27 and announced plans for one-week output of the craft in the first quarter of 1954.

A company spokesman says Doman also has sealed out a design study for the YH-31 powered by two small Boeing jet turbines for the Army, and expects to have this version flying within 14 to 15 months.

■ **Flight Tests.** The initial YH-31 (photo above) flew only 52 days after production testing had been completed. First flights in words of approximately 38 mph were successful, and several days of flying followed "without pecking the pilot in the" posttest Golden S Dunsburg area. The craft's empty weight was within 15 lb of calculations.

The craft flew for the first time with a cab over the cockpit and without its seven-foot landing doors after only 40 min. many times. Part of the credit for this achievement, according to the company, is due to a novel mechanical-type blade tracking device developed by Doman, which ensures balanced blades prior to mounting them on the rotor. Details of the device are being kept under wraps until patents are obtained.

■ **Development.** Much of the YH-31's development was executed over the early L-2's, but the new craft differs in several respects:

- **Rotor.** Has 48 in. diameter, compared with the L-2's 45 in.
- **Powerplant.** Is a 400-hp. Lycoming, whereas the L-2's had 250 hp.
- **Gross weight.** of the YH-31 is 5,600 lb.

An operating feature of the new Doman's prewarped tailboom is the exhaust ports cooling system, developed in cooperation with Licensing Services at Wright-Patterson, Ft. W. It handles the cooling load at an expenditure of only 10 hp., compared with approximately 50 hp. needed using a fan, Doman states.

The YH-31 is slated to undergo approximately 10,015 hr. of flight time prior to a 100-hr. bedown test. Number two rotor is to be instrumented for stress gear tests and CAA certification tests. Doman reportedly is applying for "validate lift" approval of its helicopter rotor system. However, CAA is not expected to grant this type of approval at present.

■ **Crew Capacity.** The YH-31 is an "all-terrain" machine by the military and only a small number are on order, although Doman expects further service contracts following demonstration at its only site.

Prospects for the eight-to-10-place civil L-2's model look favorable, company spokesman says, particularly about Doman's sales manager and contract administrator, Cole Montgomery, recently returned from a visit here of potential markets. An L-2's is slated to be shipped to Japan in approximately seven months. The company's list contains several inquiries from nearly 40 civil and government agencies, mostly foreign. It is concluded that by the end of next year some 60 L-2's will be in operation. A two-hour service time of this model will also be available.

PAA, CAA Disagree On '377' Performance

Pan American World Airways and Civil Aeronautics Administration disagree as to disagreement over takeoff acceleration performance of PAA's Boeing Stratoliner.

PAAmen severely completed tests at Muroc as an Stratoliner to determine whether a reduction in engine rpm from 2,700 to 2,600 for takeoff had any effect on the takeoff characteristics of the aircraft. PAA officials concluded that there is no significant difference in the aircraft's performance between the two rpm. Although CAA always vigorously agreed with PAA findings, their study of the report

indicated to them that the Stratoliner itself underperformance had been deficient all along.

Industry observers say the report submitted by PAAmen to CAA concerns takeoff acceleration performance of the Stratoliner and is intended to substantiate the airline's desire to reduce takeoff rpm by 100 because that the aircraft has been deficient in acceleration characteristics to the extent of requiring more than 160 ft. additional runway than limitations established in the plane's flight manual. Converted to horsepower, this means that each aircraft's maximum output is deficient by more than 125 hp. From the point of view of weight, the plane's acceleration is equivalent to the same aircraft carrying an overload of more than 8,000 lb. above its maximum takeoff weight of 117,500 lb.

■ **Re. Wt. Wt.**—Informed sources say CAA officials are struggling for the time being that PAA operates on Boeing at "dry" maximum operating weights, instead of at the "wet" weight currently in force. Hence it is that the takeoff weight for the B-377 is about 250 hp. per engine less than wet power, a figure approximating the 125-hp. loss CAA engineers report for PAA Boeing planes.

PAA men will have completed all its R-1400 engine on the 377, from the B-3 to the B-4 configuration. This should have little bearing on takeoff performance, however, since there is little if any difference between the two engine configurations, says a PAA spokesman, according to Pratt & Whitney Aircraft and PAA engineers.

Prime purpose of the change, which involves installing completely new power and new sections on the engine, is to raise the powerplant's output, but, a goal which the PAA modification is expected to accomplish.

The takeoff rpm reduction resulted from PAA reweighting all its Stratoliner. American Standard properties to make them more resistant to corrosion and shatter from rocks and other runway debris. Whatever problems dictated the takeoff rpm reduction.

Pioneer Pilot Dies

Walter H. Roskoff, 43, demonstrator flying star of America's first big air shows and top pilot of the Wright Brothers exhibition and coming tour, died today in Los Angeles.

Roskoff was the first American student of Oswald Wright. He joined after two and one-half hours of instruction in 1916 at Montgomery, Ala., and immediately began to show a flying aptitude. He was a pilot for eight flying, 4,000-hour, cross-country flights and flights with passengers

Comet Crash

• Reports indicate wings ripped off in storm.

• Inadequacy of forecasting in Far East a factor.

By Nat Moskowitz

(McGraw-Hill World News)

London—Crash of British Overseas Airways Corp. Comet G-ALVY near Calcutta, May 2, underlines tragedy of still foreseeable association of civil jet flying.

The Comet, in which 37 passengers and an crew were killed, left Calcutta's Dum Dum Airport at 4:30 p. m. local time May 2 enroute to New Delhi on the Singapore-London service. Crew chiefs at the airport were good, but pilot was warned that a severe tropical storm was swirling close by line of flight from west northwest.

Six minutes later G-ALVY reported it was climbing on track. Minutes later Calcutta was struck by a severe electrical storm with winds up to 62 mph. Nothing further was heard from the Comet until seven minutes later, when by another BOMC pilot sighted alone later some 20 mi. northwest of Calcutta. Wreckage was scattered over an area miles.

■ **Wings Split Off.**—Reports leave little doubt that Comet was caught in very severe turbulence—accompanied by much lightning and possible snow. But wreckage indicates the wings literally were shredded off at flight. Timing indicates the Comet was about 10,000 ft. at the time of disaster.

So complete was disintegration that it is doubtful a pending report of Indian authorities will add any further light on actual cause of crash. No gas explosion, current, very unusual lightning strike is possible, but loss of control through buffeting seems most likely.

It was the first fatal crash of a Comet in scheduled routes. Another BOMC Comet was destroyed in a takeoff crash at Roorkee last October, but no one was seriously injured. A Canadian Pacific Airlines Comet 3A crashed and burned on island at Kishinoue, Hokkaido, Nov. 2, on a delivery flight to Australia, killing five of 14 aboard and seriously injuring six crew members.

■ **Speed and Storm.**—The crash leaves the occasion unanswered question in its wake.

■ **Does Highspeed of civil jets materially increase danger of crashes in severe turbulence?** A Quaker Airways Airways Contribution New Zealand says the same cause in the Comet part

Comets End First Year in Black

(McGraw-Hill World News)

London—British Overseas Airways Comet service was a year old May 2, and the airline's chairman, Sir Miles Thomas, announced the jet transport "has made sufficient profit in the year to cover interest on capital."

Sir Miles based his claim on "realistic" costs being, evenly as applied to all operations factors. It includes the cost of route pricing and taking into account opportunities over the life of the service. BOMC figures Comet contribution on an eight year basis.

High load factors had the truck load factor on all services—London-Colombo-Canton, London to Calcutta, Singapore, Tokyo—more average 75% to show a profit, BOMC says.

On the South African run, the load factor must be 75% for profit, actually it was considerably better than that for the last year. On the Far East route it must be 55%, a figure unlikely to have been reached over any appreciable period.

Mr. Miles would not say exactly how much profit the Comet made, but BOMC told American Wire that BOMC ran its first operations on the South African route netted about \$12,000, Singapore about \$6,000. The Calcutta run was slightly loss, the Tokyo service is only a small odd.

BOMC's eight Comet is now based in Rangoon during the year 1953 operations, carried 27,706 passengers, 184,414 enroute, passenger-miles during 9,540 flying hours.

During the year, gross before overhead for Comet Group jets was exceeded from 190 to 452, with a balance between 600 to planned.

Commonwealth countries met in London to promote better forecasting.

A day after the crash, BOMC announced that the airline would contribute to a fund for the relief of the victims of the disaster. The fund is a contribution to the relief of the victims of the disaster.

■ **Spent Conditions.**—Meyrick said "considerable technical work is in the course of checking up on Comet for the last six to eight months of the newer Comet. The crash may well be due to a combination of the Mark 2 to some time.

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White House Studies CAB Staff Setup

The White House is considering replacement of one or more Civil Aeronautics Board members to achieve economic regulation. The action is subject to approval by three of the five CAB members.

The most likely of staff target for the new Administration is Gordon Bass, director of the Bureau of Air Operations, which handles all economic regulation matters for the Board.

Four CAB members have been with the Board longer than one year and generally are satisfied with present staff levels. But Washington Chamber of Commerce all three Republican members is to continue to White House suggestions, more of air candidates for presidential disapproval as CAB chairman next year.

British Blast CAA Comet Stand

[McCauley 1992 World News]

London—Lord Humberston of Tans, chairman of the British Air Registration Board, has fathered a child in the water in the Anglo-American controversy over certification of the Comet 2.

"It was with some astonishment," said Lord Brabazon, "that we learned that the U. S. has refused to validate our embassy. The U. S. attitude has given rise to a very curious and sinister situation."

It was a little difficult to see what the ARS chairman was talking about. Approached by AVIATION WEEK, he admitted he should have referred to the pending application for Comet 1 certification, which he is aware has not been turned down. He was under the impression that Civil Aerodynamics Administration insisted on padded engines for civil jets and was happy to hear that no such restriction has been decided.

► The Problem—What appears to be bothering Lord Brabazon—and much of the British press—is the attitude of CAA. The British cannot understand why CAA shouldn't agree that ARB is a competent authority, that its recommendations in specific cases like the Comet 3 should be good enough for the U.S.

CIA administrator Fred Lee's recent speech before the Airport Operators Council at Kansas City still wreaks here because Lee blithely omitted mentioning that the Reflets already have certified two civil jets—Comets 1 and 2. To the Reflets, this omission seemed an implicit charge against ANS's safety standards.

► **Talks Stymied**—Meanwhile, latest exchange correspondence between CAA and ARB does confirm the fact talks on Coast 3 certifications have been considerably stymied.

CAS administrator Lee has informed the British he sees no further scope for talks on standards for civil jet airplanes until the U. S. has built a civil jet of its own and the CAS has tested it.

At the same time, Lee told the British that life once could be done toward restoring the Canal Zone until the CAA has a chance to support it and fly it. The whole purpose of the recent Anglo-American talks on certification was to find some agreed basis of shortening the time required for this.

■ **New Mission**—CAA's 12-man Technical Committee on Jet Transport Requirements is due to come to Britain some time in late August or September to study Conquest 1 and Conquest 2 designs. CAA told AVIATRONE WEEK in April that it would be willing to advance this date in view of the British desire to speed an action. But Le

has made no such offer to the British
[4]

Meanwhile, ARS has told both the Ministry of Civil Aviation and the Havilland Aircraft Co. that it considers matters have gone as far as they can on the technical level. The British government has backed its spokesman in Worthington. Sir Roger Milham, the country and Milham has taken it up with the State Department.

This expense can go as far as to quite a while—perhaps as much as two years, according to PricewaterhouseCoopers, in order to enable that long as the three Cones is in its last on order. De Havilland can always switch PanAm's Cones to other customers at the last moment.

But de Havilland obviously would lose a lot of prestige if the contract fell through. The effort is third in line at a refusal by CAA to accept British certification of the Comet 3 could cost the company much export income. —N. N.Y.

U.S. Set to Re-open Talks on Comet 3

Plans to start merging Civil Aeronautics Administration's proposed jet engine certification standards into over all federal regulatory transport requirements are expected to be implemented soon.

Meanwhile, CAA is also working to lobby to meet the British Air Registration Board in Great Britain to take up further problems on certification rules for the de Havilland Comet 3.

Issues close to administrator Ford ■ For instance he will face a new top-level engineering policy to eliminate the "driving at in three directions" on transport requirements, imposed by the U.S. aviation industry as characteristic of CAA policy under Lee's predecessor (Aviation Week Apr. 20, pp. 33-35).

Two-fold effect of the new policy is anticipated.

- A single CAA viewpoint on overall transport regulations will be developed.
- The existing CAA engineering team, assigned virtually full time to jet transport planning, soon will be returned to major aircraft engineering assignments at a revamped Office of Aviation Safety.

At a press conference attended by nearly every British reporter in Washington last week, administrator Lee re-emphasized points he made in an American Wire interview (Apr. 13 p. 27):

★The CAA got transport from stands ready to go to Britain to arrange one-off flights to take about the Coast. 1 of the

ARRs only for earlier meetings than the tentative August or September date.

Admiral Lord Lee said a statement in the British House of Commons by Minister of Civil Aviation Alan Kennedy Bowd about Comet 3 certification generally was consistent with U.S. views. However, Bowd was quoted as saying the problems of aerodynamic requirements must be settled before the U.S. will recognize British certification. The

Lee pointed out major differences in passenger capacity and powerplants between the Comet 3 and earlier Comets now flying. He emphasized that there is no request for U.S. certification of the Comet 3 and 2.

"We have never asked to certify the Comet 3," Lee said. "Our discussions have been strictly for the purpose of establishing safety standards applicable both to the British and ourselves."

CAA is prepared to work with the

New Copters Make Debut at AHS Show

Two new rescue helicopters, the Paella H21 and the McCulloch YH 36, largest and smallest tandem rotors, now flying, are scheduled to make their public debut at the Washington air show in conjunction with the annual annual forum of the American Helicopter Society in Washington, May 14-17.

Air Force Undersecretary James H. Douglas will be principal speaker at the forum, night dinner at the Manassas Hotel, Saturday, May 16. Gregory C. LeMay, New York aviation consultant, will act as moderator during a couple of sessions, including "How Can Helicopters

Delayed from various reasons, the first

Members of the helicopter industry will display their products in an exhibit in the First American Cabinet Rooms of the Mayflower during the forum.

The helicopter, my share. Standby and descend at Bolling AFB, is planned in conjunction with flood-wing attack and blimp concentrations and will include the two new tandem engines, Bell 501-17 and MTI 503-17. MTI

H-1, H-2, H-3, H-4, H-5, H-6, H-7, H-8, H-9, H-10, H-11, H-12, H-13, H-14, H-15, H-16, H-17, H-18, H-19, H-20, H-21, H-22, H-23, H-24, H-25, H-26, H-27, H-28, H-29, H-30, H-31, H-32, H-33, H-34, H-35, H-36, H-37, H-38, H-39, H-40, H-41, H-42, H-43, H-44, H-45, H-46, H-47, H-48, H-49, H-50, H-51, H-52, H-53, H-54, H-55, H-56, H-57, H-58, H-59, H-60, H-61, H-62, H-63, H-64, H-65, H-66, H-67, H-68, H-69, H-70, H-71, H-72, H-73, H-74, H-75, H-76, H-77, H-78, H-79, H-80, H-81, H-82, H-83, H-84, H-85, H-86, H-87, H-88, H-89, H-90, H-91, H-92, H-93, H-94, H-95, H-96, H-97, H-98, H-99, H-100.



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Korean Island 'Captured'



MARINES crew up on USS Seib's elevator to catch helicopters for shipboard launch missions on UN-held Chuk Tok Island off Korean coast.



DISSEMBARKING on the beach, 3d Division Marines scramble out of HH-3 to bring up positions on beach during Operation Madax.



SUPPLIES stored for the Marines-established island are picked up on beach by HH-3s using wire containers slung under the copter's hoists.

By Carrier-Copter Team



COPTERS loaded with Marines from escort carrier and land for island. With Sikorsky HH-3 and HH-3C (S-55) types were used in the maneuvers.



RETURN TRIP to light carrier to pick up more assault troops (left) led by two of the big copters in Marines slowly landed beach island.



LANDING on the Sicily after trip to beach, HH-3 is guided by flares (foreground) as another copter makes approach. Note HH-3C parked in rear.



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Announcement

Scott Aviation Corporation, Lancaster, New York and Farnel Industries, of Buffalo, New York, announce a joint program creating an outstanding engineering and production team to supply military and civilian aviation oxygen breathing equipment and special apparatus.



Farnel Industries have been a major factor in the recent important development of extreme high altitude oxygen equipment, including control apparatus for full pressure and partial pressure suits.



Scott Aviation has long been associated with developments in the Aviation industry and is a major producer of aviation oxygen breathing equipment for military and civilian uses.



The combination of development talent and production capacity represented by this collaboration gives tremendous assurance to military and civilian aviation that the end result will be the finest equipment in the world.

P. Edward Mendenhall
Pres., Farnel Industries

Earle M. Scott
Pres., Scott Aviation

Defense Proposes New Fastener Specs

A proposed compromise settlement of the 14-year old standardization controversy over quick-release fasteners for aircraft is now being considered for consensus within the aviation and fastener industries.

The Aeronautical Standards Group, Department of Defense, has asked return by May 12 of comments on a new specification, which would adjust the two basic fasteners in dispute to different standards. The action was prompted by Aeronautics Week in the Feb. 9-17, 1968.

More modification in the new proposal, MIL-F-5591A specifications now in force set up three styles of fasteners. The third essentially is the same as a design built by Cadillac Fastener Corp. The Cadillac assembly was designated NAS 469 by the National Aeronautics Standards Committee of Aircraft Industries Assoc. and is advocated by most aircraft companies.

Industry Reaction—Industry sources predict the new proposal will meet with approval from most aircraft manufacturers and the Cadillac company. Position of the other fastener companies is not yet clear.

An Aeronautics Week sheet with some of the other companies indicated they are studying the proposed specifications seriously, along with the results of a Jan. 14 Air Force/Navy industry conference at Wright-Patterson AFB. But they have not completed their analyses and say that they are not prepared to comment.

Blair Davidson—Ministry of the Jan. 14 meeting stated that the industry would not grant blanket deviations from the MIL-F-5591 fastener specifications, that requests by aircraft manufacturers for deviations would be considered individually and "grounded" expeditiously. This procedure, presumably will continue, pending decisions as to the adoption of the proposed specification revision.

Here is how the new specification defines the proposed three styles of fastener:

• Style 1 (deep dimple) fastener shall be of the stud receptacle design—when fastener is opened the stud assembly is retained by the outer panel and the receptacle is retained by the panel support.

(This type is essentially the same as the present MIL-F-5591 fastener made by the Dow, Loon, Fichuray, Scoville, Shaluproof, and United Car fastener organizations.)

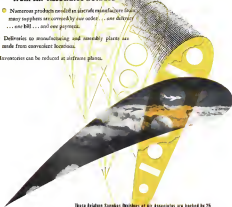
• Style 2 (deep dimple with groove):

• Style 3 (shallow dimple with groove) shall be of the stud groove stud

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The MC-4 is the first tandem rotor helicopter to be certified by the CAA. It is in production in quantities for the U.S. Army and Navy. Plans for commercial production are being formulated.

Wherever they go, whatever duties are assigned to them, McCulloch helicopters can count on dependable, efficient power from their Franklin engines. Franklin engines have earned their position as standard equipment in 4 out of the 5 CAA-certified helicopters under 400 h.p.

AIRCOOLED MOTORS, INC.—SYRACUSE, N. Y.



New size knowledge of Franklin engine for helicopter use in Army and Navy.

capable design—when the fuselage is opened the stall is retained in the coning by the ground. The ground stall is designed to carry the load into the outer panel and to protect the outer panel from contact with the stall. Styles 2 and 3 groundstall shall be independently retained in the outer panel and removable without damage to the panel. (Style 2, it is understood, will require some modification by all the turbine manufacturers.)

There is some speculation that other manufacturers may make Style 3 fuselages in competition with Genko, but this point has not been cleared up. Some of the other companies made comparable fuselages during World War II.

Red Tape Blocks Air Defense Huggins

Governmental red tape, excessive civilian controls and "the porous character of the military construction agency to handle the work" is depriving the U. S. of adequate defense air defense, a former high-ranking Air Force official charges.

E. V. Huggins, former Assistant Secretary of the Air Force, now a vice president of Westinghouse Electric Corp., told *FlightWeek*, N. J. Baranov recently that construction of an adequate system of air bases is "the most critical problem facing the defense of the U. S. today."

"There is nothing worse about the construction of an air base than a good organization cannot help," Huggins says. "At the present time, that organization does not exist within the United States government."

Citing the construction shortage in Korea recently uncovered as a serious problem, the Westinghouse official claims that "there is long-range neglect of the Korean situation does not have the importance that lack of an adequate air base structure can have on the future of the U. S."

Huggins says the current system forces time-consuming transfer into the path of construction progress. He recommends as a solution more centralization of responsibility and authority in the Air Force.

"Even after Congress has authorized a great air base and appropriated funds, there are major time lags, hence unnecessary costly obstacles," Huggins says. "Two more approvals must be obtained in the office of the Secretary of Defense. Still another must be obtained in the Bureau of the Budget. Then the Armed Services Committee of the House and Senate must approve again, if it is an overseas base."

And then the Army Engineers take over to do the construction work, and



These special plastic sections, developed and tested by Goodyear Aircraft, will form gunfire-resistant fuselages. After the fuselage sections are in place, the rest of the aircraft is built up in the shape of the egg and the sections.

EGGS THAT HATCH GUNFIRE



The advent of high-speed aircraft called for the substitution of antennas and electronic devices beneath the exterior surfaces of the plane in order to eliminate "drag" or wind resistance.

The jet era also brought new demands for higher electrical performance combined with structural improvements in aircraft plastics.

Goodyear Aircraft Corporation, under an Air Force Program, developed alkyl-azobiscarbonate foamed plastics that could be shaped as complete, stable plastic sections in a plane's fuselage, wing or radiator section.

Though successful, these initial sections were found

to crack under the bullet-like pounding of raindrops encountered in high-speed jet flying. So Goodyear research produced a coating known as "23-56" which permits the safe use of plastic sections in countless aircraft today to save weight and house vital electronic equipment.

Pioneering and producing high-performance, void-free laminates is just one of the successes that has made Goodyear Aircraft stand out as America's most versatile aircraft manufacturer—builder of virtually every type of component used in modern aviation, as well as producer of complete aircraft and shipships.

For more information, write Goodyear Aircraft Corporation, Department 65, Akron 15, Ohio.

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the Air Force, which cost more and was not as good as the one that was used. No other military program has to run such an elaborate course.

He expects that the American construction industry, which has the "organization and talent," be given the task of so low construction since the military is not so equipped.

It will cost less to get needed air base structure promptly with "private industry building the program done to do it not over a period of time and take advantage, more in the defense of our nation," he adds.

"There is no point in spending billions on atomic weapons if we do not have the means of effectively prompt delivery upon an enemy. Prompt delivery can be assured only if we have adequate air bases within striking distance of our possible aggressor."

New Firm Finances S&W Super Connies

Those of the four Super Conestogas entered by Seaboard & Western Airlines Inc. last year for delivery in 1954 will be financed by American Equipment Corp., a new firm organized specifically for the S & W purchases.

Cost of the three Super Conestogas with spare engines and parts will be \$4,750,000. The equipment will be leased to Seaboard & Western for ten years. The leasing now operates near cargo DC-4s. Each Super Connie will have an annual cargo capacity of 100,000 lbs. pounds at 18 knots daily utilization.

American Equipment Corp. will be financed by the net sale of its securities and a \$4 million loan negotiated with the Chase National Bank of New York.

The new firm has applied to the Securities & Exchange Commission for registration of \$1 million of 6% subordinated debentures due in 1964, 8,000 shares of 4% preferred stock (\$50 par) and common stock consisting of 8,000 shares common stock (\$5 par) to be offered for public sale at 1,000 units, each consisting of 51,000 of debentures, 8 shares of preferred and 8 shares of common stock representing 8 shares of common.

Organization of the new holding corporation was suggested by Herbert Charney, partner of Bernstein & Charney, a New York law firm, retained as attorneys by S & W for several years. Both Bernstein and Charney are stockholders of the Seaboard line.

Charney will be president, director and treasurer of the new firm. John J. Manning will be secretary. Walter T. Goshier and Harold P. Meier have been appointed directors.



PIASECKI H-21 HOISTS TRUCK-LOADS TO MOUNTAIN-TOP OR JUNGLE

Helicopter transports now can carry several tons of cargo and land it safely anywhere. In future years the helicopter may save the cost of building roads and runways in many undeveloped areas.

The H-21 helicopter built by Piasecki now is being service tested by the Air Force under the most rugged conditions they can find. It can perform many heavy transport jobs in military operations, such as moving planes, tanks, construction equipment

where it is needed in peacetime and fight conditions to warlike points.

Coffin the "Work Horse" by the Air Force, the H-21 can carry several tons and land in places a horse can't reach. It's one "Work Horse" that's made as a pony.

Camloc fasteners (shown below) are used on the H-21 to give dependable service under rugged conditions. Camloc fasteners successfully withstand the unique type of vibration found in helicopters.



FASTENER CORPORATION

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BEA's VISCOUNT started the world's first passenger service with turboprop aircraft last month. BEA gets much experience from it.



DART DARTlet fighter, C-47 converted to turboprop, first was put on regular cargo schedule after delivery in 1951.

What's Different About a Turboprop?

The world's first passenger service operated with turboprop aircraft was inaugurated Apr. 15 by British European Airways from London to Cyprus. The planes are BEA's "Discoveries" also—the Vickers Viscount "700 series"—powered by Rolls-Royce Darts. The viscounters operated by these engines has impressed passengers, as reported in *Nat* McKitterick's reader story on this new service (*Aviation Week* May 4, p. 25).

This authoritative story on BEA's operation and maintenance experience with the Dart turboprop has been written especially for *Aviation Week* by James H. Stinson, British engineer who has previously reported for us on the theories of the turbo engine (*Nov. 26, 1952*, p. 25) and the development of the de Havilland 110 all-weather fighter (Sept. 23, 1952).

As service starts with Viscounts, here is what BEA has learned about propeller-turbine Darts.

Any airline operator regards the introduction of new equipment with caution, based upon long and better experience. It is a fact that no new engine in new airplane has gone into service without a period of testing troubles, the aircraft to be equipped in this role being the Comet. It is even more so when both the engine and airplane are new.

These facts are the basis for a consideration of the coverage required by Rolls-Royce, BEA's chief engine, to take the lead in ordering the Viscount, a new airplane with improved engines, lacking either maintenance or personnel. Behind this decision lay many weeks of technical analysis and discussion between the staffs of BEA, Rolls-Royce, Vickers-Armstrongs and the Ministry of Supply which financed

the prototypes of both engine and air frame.

However, it is upon Mayfield, chief engineer Beverly Mayfield, and director of flight operations "Jimmy" Bruce that the ultimate responsibility rests.

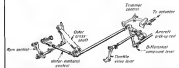
• **What Was Learned**—When the Dart-powered Viscount went into service last month, BEA had already amassed considerable experience from a longer lasting test stand program and from Dart-Dartlet fighter operations. These are the major factors the crew had learned.

• **Air crews have confidence** in the engine and would not care to go back to piston engine again.

• **There has been no difficulty** in fitting the turboprop fighter pattern into standard air traffic control.



DART TURBOPROP ENGINE installed in one of BEA's converted C-47 fighters



WATER/METHANOL system takes power from camshaft injection pump and sprays 50%.

• **Flight planning and loading**, in spite of added temperature factor and precise fuel calculations, have proved simpler than anticipated, and an anxiety is left about their regular application.

• **Maintenance and inspection** requires far more a considerable reduction in routine check work on these engines, and less work on the various bearings of the reduced vibration.

• **Powerplant adjustment** also installation changes and very precise instrumentation accuracy will be desired of turboprop maintenance.

• **BEA feels** that maintenance costs ultimately should be lower than for a comparable piston engine.

• **Something New**—Putting an entirely new type of power unit into service, a type for which background experience is naturally absent, is a completely different story from that of adopting a new variant of a piston engine.

In the case of the Dart engine, not only was there no information and little time operating as engine work, but there was no knowledge of the behavior of the turboprop in a climb. The behavior experience was limited to military use,

and the military outlook is almost the opposite of that of the civil operator (*Aviation Week* Mar. 16, p. 24 and Apr. 25, 1952, p. 21).

BEA fully appreciated this aspect of the situation and their project and development teams, under Robert Meakin, evolved a test program with Rolls-Royce, designed to remedy the deficiency.

First, static test stand testing, representative to nearly as possible of service conditions, was worked out, with a cycle typical of daily operation on the BEA network. Engine power and speeds were chosen to give rise, take off, climb, cruise, loiter and fuel two times. Variables were fed into the schedule to cover thinking and weather conditions. Water and fuel were chosen at the engine's temperatures were varied as much as possible. Both hot and cold starts were carried out so that quick turnarounds were simulated as well as normal operations.

An important feature of this development plane was that Rolls-Royce carried out only those operations envisaged under operating conditions. This pro-

visional suspension schedule was drawn up by Rolls-Royce and BEA and had the approval of the Air Registration Board—the British civil licensing authority.

• **Flight Program**—Complementary to the test stand program was the Dart-Dartlet (C-47) ferry flight schedule. Here the idea was to obtain flight operational experience from air crew and air traffic control viewpoints, as well as straight engineering knowledge of propeller turbine behavior and maintenance. Extensive of engine overhaul life was a key target in this program.

With the Dart-Dartlet fighter BEA was fortunate in having the engine cool and installation changes, as well as space, put for by the Ministry of Supply under the Dart development program. BEA applied the schedule and bore the full expense of operating the fighters.

Some of the cost was recovered in the form of freight revenue, but it is important to understand that the two Dart-Dartlets were not vehicles. They were flown as regular schedules in order to gain operating experience under realistic conditions. They were not economical because their standard C-47 trucks restricted range and their isolated, unpopulated holds meant excessive cargo loading for cruising above 20,000 ft.

The first Dart-Dartlet was delivered to BEA on June 9, 1951, the second in September of that year. An crew testing and performance/contamination checks to obtain service control and adjust operating data were the first tests.

The first scheduled service was inaugurated from Northolt to Bockingen, Germany, Aug. 15. Other schedules followed, to obtain representative conditions of operation: London-London-London, London-Amsterdam-Copenhagen-Stockholm were the most important routes. Miles, with ambient temperatures of over 200° F in summer, was particularly useful test of the turboprop over its long range.

• **Air Traffic Control**—These proving tests revealed no ATC difficulties due to rapid climb and descent—both commonly 1,600 ft. per min. or more, per second. The writer can vouch for the apparent simplicity of letting down at this rate at angle from 20,000 ft. though thick clouds with the best at 20,000 ft., in Stockholm and in the lower London control zone.

BEA's greatest problem with the Dart-Dartlet was to combine outside to achieve their own and that. The Dartlet delivery was not selected with the best of British military standards as a standard airplane at 20,000 ft. There was an occasion when an Amsterdam ATC officer stated that the BEA pilot must be mistaken in thinking he was flying

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AIRCRAFT PRODUCTS DIVISION

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a C-47. It is also true that a SPS pilot was entirely successful when he landed the British pilot sporting "Boeing Ducks" of 18,000 ft. Even other BSA pilots were sometimes taken by surprise, as was the case when a Viking was guided by a C-47 traveling at 225 mph indicated speed.

► **Air Crew Operator-Pilot reaction** to the tailhook proved to be very favorable indeed. The two dangers were said to be the center for turning the captain and first officers of the latest Viscount flight. All pilots found the new technique acceptable and without exception, maintained they would be willing to return to piston engines.

The tailhook pilot in hand with a completely new landing technique. Yet despite this, and the fact that the engines were in an airplane associated with high and fast cruising, the smooth, steady performance of the Dart rapidly acquired complete confidence.

► **Special Fasteners**—Each engine is controlled by a single lever, which operates the fuel mixture valve and the propeller constant speed unit. In this sense, which is completely revolutionized, the duties of the propeller governor in fact when engine power is altered, so that large changes in engine rpm are not communicated directly to the propeller.

The interconnection of fuel supply and propeller rpm control is dependent upon temperature and the device is adjusted in accordance with the ambient intake air temperature by a control called the fuel mixture. Adjustment is made on the ground during run-up to a scale giving the jet pipe temperature in relation to rpm. Fuel restriction with altitude is automatically regulated.

Since the Dart propeller is geared to the main hubcap at the propeller it is necessary to have a very low blade angle for starting—yet this same angle would cause too much drag when making an approach.

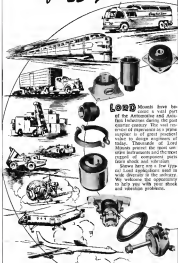
The solution is overcome by having two low-pitch stops, one for ground operation and one for the air. A switch on the landing gear strut operates the flight low pitch stop so that this is withdrawn only after the gear has come forward. Once this happens, the extra drag of "docking" helps slow the plane.

An override switch is provided in the cockpit to allow ground taxing with either pitch stop.

Another Dart feature is the water-mechanical installation which, instead of being a power booster, is a power oil shifter. The Dart engine is designed to give full power under ICAN conditions, that is 50% for every 1,000 ft in temperature above that there is a 1 1/2% drop in power. The new engine is rated at 1000 hp at 1200 rpm. The new engine is rated at 1000 hp at 1200 rpm. The new engine is rated at 1000 hp at 1200 rpm.

Once published on, the new engine is

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STRETCH



Journal des Économistes, 1894

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LABORATORY REPORTS HAVE
revealed a 200-megawatt storm, which
12:15 AM. The storm is expected to
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The storm is expected to be about 100
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Valve Talk

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The simple name for it is "customer service." If you like formal terms, call it inter-office coordination or area cooperation. But it all adds up to the same thing — Whitaker field engineers, convinced they have the best valves available, are out to sell them, and to make friends in the process.

They've found that one of the best ways to convince a customer is to figure out the problems he'll face and have the answers BEFORE they're needed. It boils down to consistent planning and coordination that is representative of a Whittaker-wide eagerness to stay ahead of the game. The B-47 program is a good example.

There are somewhere 190 Winstat values on the Kuring Staircase. Those stock sweepings are now being built of these plants. During it Western Douglas at Tulsa and Lockheed at Marietta, Georgia — with great competence in the field of the Kuring Staircase, Kansas City, Missouri, Detroit, Texas, Dallas and other cities.

As Lockheed approached the production stage on 474 at MS&W, the field engineers in Whittaker's Indianapolis office were advised that the George plant would be their ally.

It would be a matter of standing by and let the Mustang plant wanted to be self-sufficient and then looking for a way to get the Mustang plant off the ground. It was almost a matter of standing by and let the Mustang plant wanted to be self-sufficient and then looking for a way to get the Mustang plant off the ground.

Field Honey and Art Grogan in the Indianapolis office know little of the name winners on the Sorapets, but they know there'd be plenty of questions eventually: so why wasn't there?

[illegible]

The knowledge proved available in a large bomber plant going through the throes of wartime production. Lockheed had Whittaker's name information (including complete file and drawings) at its disposal when it was needed.

the pit pipe to the tail cone has been instrumental in protecting the engine as a result of the already excessive heat the installation causes.

The centrifugal compressors have remained completely undamaged, even when operating from dust airfields in summer. Electrothermal arctic corrosion protection has proved entirely adequate under all conditions.

One year went very much like 1957 when the cages of the collection group yielded eight bearings began to diverge. Kolb-Ravitz tried several types of bearing, but eventually decided the best solution was to dispense with the cages and use tight-packed rollers. Since the change was made has been experienced. The fault was not a primary one and there was no flight failure, but it would have led to a major failure. So a precautionary 150 lb. inspection was instituted prior to the fitting of the new bearing.

British European Airways' operating experience with the Rolls-Royce Dart up to Apr. 16 1963 tested 6,266 hr.—1,444 engine hours with the Dart-Defolite and 2,812 with the first pre-delivery Vickers Viscounts. The four engines of the Viscounts at present being used in service for aircrew training, rapidly accumulate overall engine hours.

Hurley Urges More Process Research

A drugging plot for waste protein research in salmon was made by Ray T. Hurko, Carter-Wright Corp.'s president and chairman of the board, at the opening of the Society of Agricultural Engineers' production forum in New

► **Process Studies Vital**—Harley stresses the need for spending more time and money in research on manufacturing processes in an activity entirely distinct from engineering research. His point:

But that within the last few years the aircraft industry has spent more resources for engineering research than has been put into making production improvements.

Hardly, says this quarter expenditure is enough proper for the results obtained. But he contends there has been a failure to do the best job in making these very wonderful gadgets.

The unit cost of aircraft and components can be reduced through proper research studies, if a researcher



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Am 2300 Steepwing Configuration

French Glider Tests Wings

One of France's latest research projects is the double purpose glider shown in the accompanying photographs. It is currently being used as studies of lowspeed flight characteristics of a supersonic fighter.

Using the same design, French engineers at Sneras (Société Française d'Etude et de Construction de Matériel Aéronautique Spéciale) are able to get direct comparisons between supersonic and delta wings at little expense.

The glider can travel to about 16,000 ft and released. During their experiment glider back to the field, then second and transient test data.

► **Design Features**—The 40 ft fuselage, common to both designs, appears to be a simple body of revolution with a jet engine at the rear end of the tail. (Lateral loading gives is fixed.) A nose wheel is located at about the tail fin height point, and there is a smaller wheel located forward.

At the wings there are two air intake ports with single wheels.

A large variable vertical tail mounts the horizontal tail just above

the fuselage center line. Elevator chord is extremely narrow, and the horizontal surface is adjustable in flight.

► **Steepwing layout** (Am 2301) has a span of 29 ft, 7 in. and an aspect ratio of four. The surface is swept 45 degrees. No dihedral is used. Controls appear to be conventional—plain flaps and standard ailerons.

► **Delta plan** (Am 2301) looks like a 45-degree triangular layout. Trailing edge control surfaces are split at about half-span, reducing the size of elevator inboard and streamlines outboard.

Cost weight of the glider is reported as under 5,000 lb.

► **The Factory**—Sneras is a private company which was formerly the government-owned Arsenal de l'Aéronautique. Its work is generally research or experimental.

Current developments include the Am 5341, a French extension of the Canard V-E the VC 604, an lightness Arsenal V-E requires for Naval service of amphibious and stick have accidents and weight.



Am 5341 Delta Configuration

could or hot war, in his own opinion. Harley aims no advance limit for postwar output. Even a piece can not be easily handled in the field. But advanced fabrication techniques that will be required to make these future outputs available may restrict performance improvement.

Harley sums up the situation today by noting that weight at about six orders of magnitude is needed to get the equivalent of one horsepower. In many engines, that weight factor might come down to that of one order of magnitude to get the equivalent of one horsepower.

► **How Research Can Pay-Offing**—an example of where research into techniques and materials can pay dividends, Harley refers to a jet engine part which was extremely costly because of the large number of welds required for machining (presumably the center main bearing support for the J-65 Suppressor, Aviation Week Dec. 12, 1952, p. 21). Then a new welding technique and improved cutting cut the cost to 1/7 of its original figure, and gave a better part Harley says.

He contends that under constant—modest in cost—cost, and in constant studies in such field as cutting to dimensions, extruding, faster machining speeds, better tooling and improved materials.

Further application of machinability meets the design and looking at more possible tools that are now being used by hand. Yet, Harley says, wherever a machinability program has been installed, unit costs have dropped as much as 35% and quality and production have risen.

► **The Future**—The future, he adds, is words of increasing research are generally by greater than the costs involved, however large the investment may seem at the beginning. Mentioning the C-W joint to improve machinability. Harley says that for \$175,000 an initial \$54 million savings have been realized—a 10-to-1 return.

► **Materials**—Processing difficulties with titanium are being pushed into a lot of small problems. Harley says. The national will not duplicate alloy made, he believes, because both materials will be required.

One material that has not been sufficiently recognized is glass-reinforced plastics, in Harley's opinion. He reports that an automobile is running well with plastic bearing material.

It has been reported recently that glass plastic composite M-10 have been under study by engine manufacturers, but Harley says that until there is some degree of stabilization in compressor blade sizes, plastic units for this application are not in the picture.

Performance considerations are opening a whole new material field, Harley says.

Curtiss-Wright Cuts Cost of WRIGHT J-65 Jet Engines

BY USING DUCTILE IRON

Curtiss-Wright Corporation has slashed unit cost and made mass production possible by redesign of the center main bearing support . . .

As originally designed experimentally showed the part required 3200 hours machining time on a expensive aluminum forging, using Keller dielectric machines. There weren't enough duplications in the United States to turn out the quantities required. But engineers from the WRIGHT AERONAUTICAL DIVISION of C-W simplified it into inner and outer rings of Ductile Iron. Weldability of Ductile Iron was utilized in joining two "16-8" chromium-nickel stainless steel struts to the rings.

Ductile Iron provides greater strength and toughness at moderately elevated temperatures. Moreover, it has good casting qualities and is readily machined. The rings are flash-machined to provide an air passage with an accuracy of 0.003", and casting tolerances are 0.030" on the 3-foot ring diameter. Eliminating complex contour machining, the WRIGHT redesign accelerates output and helps reduce unit cost to about one-tenth that of carving supports from gas-turbine forgings as was called for in the original design.

Consult and data on Ductile Iron are freely available. Send us details of your prospective uses, so that we may offer a list of sources from some 100 authorized foundries now producing Ductile Iron under patent licenses.



Supplies Turbo-Jet Engine Main Bearing Support original design, machined experimentally from a one-piece aluminum forging.



The redesigned support ring used in WRIGHT J-65 engines that power Beechcraft Thunderbolt fighters built by REPUBLIC AVIATION CORP.

The simplified unit comprises (below) (a) outer ring and (b) inner ring, both cast in Ductile Iron by Regimetal Casting Division of AVIATION DIVISION, C-W Corporation, Mahwah, N. J., connected with (c) struts of "16-8" stainless steel.



THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET
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Magnesium Missiles

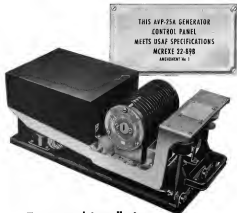
Magnesium shell is used by National Advisory Committee for Aeronautics in fabrication of research missiles fired at NACA's Wallops Island, Va., test range.

The body shell is hot-rolled from magnesium sheet 1/16 to 1/32 in. thick in conventional punch rolls (1). Three or more of these sections may comprise the body. The rolled shell is chiseled at the edges by vertical grinding on a steam-heated machine. Nose section of a test missile is shown being welded in place (2).

Contours of the shell are developed by hot spinning of the magnesium tube (3). A double tool supports the heat for the forming process, done over a cast alloy mandrel. Assembly of the components gives first check on dimensional accuracy of fabrication (4). Highly exact ball systems are made of hollow cast magnesium and are welded to the body shell.

Dimensional accuracy is checked with the master-die cast checked sheet surface plate (5). Holding fixtures permit struts to be rotated around the shell for geometry checks.

Ready to go, the completed test missile is mounted on the launching rack (6). Aerodynamic data taken at supersonic speeds will be tabulated to guide.



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For further information, call your nearest Westinghouse representative or write for Aviation Data 258-027, pages 15-16, and Aviation Data 258-028, pages 7-10. Westinghouse Electric Corporation, Box 854, Pittsburgh 30, Pennsylvania.

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SHATTER-RESISTANT CANOPY, made Lockheed test in 1/2 mile from unshattered T-33 landing surface. Canopy made in kept at 100° while cold in 1/2 hours across outside. Pressure differential of 1 psi in multi-hour stress canopy.

Flak Won't Shatter New Canopy

Shatter-resistant canopies, planned for use on the Lockheed B-94C Starliner atmosphere, have been developed at Lockheed Aircraft Corp. and are ready for flight test.

The new canopy is made of triple-laminated Plexiglas and vinyl and its words tests have shown that it remains shatter-resistant even when struck by 1/2 in. or direct gunfire. Construction is similar to that of automobile safety glass, with the exception of the different materials, two layers of Plexiglas form a sandwich with a soft vinyl core.

The edge of the canopy uses a nylon loop which is gripped by an extruded

aluminum channel forming the base of the canopy. A rubber seal fits over the joint between plastic and metal to remove pressure tightness.

The Air Force's Air Research and Development Command says that one advantage of the new head is increased safety in post and reduction in weight. At the same time, says ARDC, the design is relatively easy to produce.

Four other airplane manufacturers—Boeing, North American, Northrop and Republic—in addition to ARDC's Wright Air Development Center in Dayton, are looking over canopies for their fighters.

THRUST & DRAG

Ever dream of flying without benefit of airplane or wings? If you have, there's a way to make your dreams come true. Read "The Silent World," by Capt. J. H. Covert, and learn about underwater propulsion and swimming with the eel-like. Then go out and become.

Covert and his friends were able to "fly" under water with the help of an apparatus with the easy going and complete freedom of your dream flights. One of the men even hung on to a turtle and used him as a power propulsion. By moving with his feet flippers, the person is able to move the turtle through a series of loops. "The Silent World" is fascinating.

From Lucien R. Goss, Scientist, comes the following: "There are many theories for the cause of the sea is above. The sea, electrically speaking, is a large dynamo which represents a rotating armature, and the planets flying around the sea are equivalent to the

poles of a dynamo which are put in motion by separate control.

"The lines of force traverse the planets from pole to pole, and these lines of force are cut by the sea. A short circuit takes place on the surface of the sea, and causes a large potential air flight. The sea itself is constituted mainly of metals and is not a metallic material."

There's a little bit for everyone in this volume.

Thanks to Dave Covert and his interesting TV program "Today," there has been much interest and accurate video reporting of motion picture at last.

Within recent weeks he has shown some wonderful films of early flights. There has been footage of World War I and the spectacular Shell films of the Penetration display last year.

As visitors, Gossier has brought in Arthur Clarke, chairman of the British Interplanetary Society, for an objective view of space travel (some of the "start now for next year" philosophy) and Charles Chatterton of trans-Atlantic crossing time. We could not cover of this any time.

—DAA

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AVIATION SAFETY

CAB Report on Training Collision Between DC-4s

Danger Studied in Hooded Flights

Two DC-4s in simulated instrument flight near Oakland, Calif., collided, killing the three occupants of one of the planes. Apparently no one in either craft knew of the other until it was too late to avoid the crash. Here is the Civil Aeronautics Board's report:

THE ACCIDENT

California Eastern Airways' training flight, a DC-4, N 4002B, and Overseas National Airways' training flight, a DC-4, N 59992 collided at an altitude of about 3,000 feet MSL at approximately 1815, Nov. 17, 1955. Both aircraft were making simulated instrument approaches to the Oakland low frequency radio range. The three captain as the Overseas National DC-4 was killed, and the aircraft was destroyed by impact and fire. The two captain and one co-pilot in the California Eastern DC-4 were not injured, but the aircraft sustained substantial damage.

HISTORY OF THE FLIGHTS

Overseas National's DC-4 took off from the Oakland Airport at 0820. Captain Marion Harvey Clark, company check pilot, was in command and aboard were Capt. Hammond Glavin and Warren Carl Gustafson who were to receive their solo flight. The DC-4 instrument competency checks. There were no other persons aboard. The aircraft had been refueled with 1,215 gallons of gasoline and 11 1/2 gallons of oil. The total load was within the certified gross weight and was properly distributed. At 0831, the flight received a clearance from the Oakland tower to make a precision approach and to remain above 1,500 feet on the final approach to the airport.

At 0931, the California Eastern DC-4 took off from the Oakland Airport for the purpose of a simulated instrument competency check. Capt. Ralph A. Stepp, company check pilot, was in command and aboard were Capt. Capt. Wendell R. Kline, company check pilot, was in the left seat. Louis Goldberg, an airplane and company mechanic, occupied a cabin seat and was on board only to be gone some time. The aircraft had been refueled with 1,600 gallons of gasoline, and the total load was within the certified gross weight and was properly distributed.

According to accepted practice, both flights conducted their training check in the "key area" with all instruments above 3,000 feet. Both aircraft were equipped with hoods, arranged on the left side of each cockpit to prevent the pilot from checking outside instruments. Local fire fighting equipment extinguished the fire after considerable fire damage had occurred. The bodies of the three pilots were extracted,

leaving Overseas who acted as an observer.

Shortly before 1815, the approximate time of the accident, both aircraft approached the Oakland low frequency radio range station, which is 9.5 mile southeast from the approach end of Runway 15 of the Oakland Airport. Overseas was on a steep, oblique heading of approximately 124 degrees inbound on the NW leg of the stage, and California was heading on the stage on a heading of 79 degrees M. Both aircraft were at an altitude of 3,000 feet.

Weather conditions were good in the San Francisco Bay area at the time. The U. S. Weather Bureau reported at 1814 (three minutes after the accident), ceiling 24,000 feet, thin broken clouds, visibility 5 miles, wind with 4 mph, at Oakland. The sun's heading at 1815 was 193 degrees true, and its altitude above the horizon was 25 degrees and 27 minutes.

During a short period prior to 1815, both aircraft were observed to maneuver without any apparent change in direction or altitude. Neither attempted to avoid collision but continued in straight and level flight, and collided approximately over the stage station at about 3,000 ft. altitude.

California was at a slightly lower altitude than Overseas, and contact was made between the leading edge of the vertical stabilizer of California and the right side of the fuselage of Overseas just forward of the horizontal stabilizer. Shortly after the collision, Overseas crashed out of control on Doublet Drive, the highway paralleling the north side of Oakland Airport. Its three pilots were killed at the time of impact with the ground. A number of persons standing on the highway close to the impact site received burns of varying degrees, and several automobiles were destroyed by fire.

The top portion of the vertical stabilizer and middle of California were torn off at the collision and fell to the ground with considerable air speed of 160 miles an hour. Immediately following the collision, Captain Stepp left Captain Kline's aircraft and landed at the Oakland Airport. Captain Stepp requested permission to land on Runway 16, the longest runway, and to have an emergency prepared stand by. However, since all fire equipment was due at the crash scene of Overseas, the flight was diverted to the San Francisco Airport, 21 miles away, for emergency landing.

INVESTIGATION

Overseas struck the ground at an angle slightly beyond vertical. It did not move appreciably after impact and burst into flames immediately. Local fire fighting equipment extinguished the fire after considerable fire damage had occurred. The bodies of the three pilots were extracted,

Radiograph of automotive heater shaft-off valve



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and the wreckage was removed from the highway to restore traffic. It was determined that Captain Conrad was in the left seat, and Captain Clark in the right seat. Captain General's position could not be determined. An inspection of the wreckage inside of both aircraft indicated that they were in an extremely condition at the time of take-off, and there was no indication from either flight of any malfunctions prior to the accident.

At about 10:00, both engines were functioning normally. Pilot DC-1 checked. The first phase of the work consisted of position lines, climb and other maneuvers. It was necessary for each training flight to use the area as the work and without qualification of the Oakland crew. Also a portion of the aircraft check consisted of control

lines, level hovering, cross identification, and approach procedures. During these checks the lead is up to require the pilot in the left seat to fly solely by instruments. The lead occurred in both aircraft were at about 10:00. The seat in Overton occurred the left winged, except for its top two inches (approximately), and the left side pilot except for its top two inches (approximately). California's position occurred the left winged, except for about four inches from the center, and all of the left side pilot. The safety pilot of California made one to his right, ahead, and to the left of about 45 degrees. Overton, during the final stages of flight, was at a safety pilot at 75 degrees to the left of California, following the safety pilot from rising Overton.



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Overton was making a standard wing approach to the Oakland station without the overhead leg (135 degrees) at an air speed of approximately 140 mph, and maintaining 5,000 feet, the initial approach altitude, all as noted with winging procedure. The approach also required an "in range check list," which was in effect for the winging flight. This check list is a card by the check pilot and the approach is made by the pilot being checked.

Captain Bruce F. Shortell, Overton chief pilot, indicated that this check is completed one at two minutes prior to arrival over the range station on the initial approach. He further stated it required about one minute to complete the check.

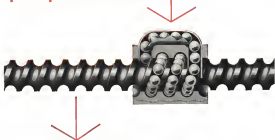
According to standard winging procedure, at least three pilots are scheduled for training flights so that one can act as an observer. Normally, the observer stands on the winging's stand looking from the observation, particularly during turns and other maneuvers. He also is required at times to look from within window on the left side for other aircraft. Company practice requires the flight to contact the tower, even under VFR conditions, one to two minutes prior to reaching the range station, in preparation to make a simulated low approach to the airport. The Oakland Tower records revealed that Overton was cleared to make an approach at 10:15, five minutes prior to the accident, but no request from Overton was received by the tower immediately prior to 10:15. The captain of California indicated that he was just about to contact the tower as sound with his company's practice when collision occurred. However, under existing Civil Air Regulations written flight was required to remain in the lower under VFR conditions.

California required an ADF approach during the check flight, and at 10:50 Captain Blake requested Captain Kamm to do a "line and distance" problem from the Oakland Radio Range Station. After receiving clearance in reference to the range station and contacting the four Overton, as last known, Captain Kamm took up a heading of 75 degrees heading an altitude of 5,000 feet, around 170 mph. At the flight around range station at 10:15, a radio check was made and California was around about 50 degrees to its right. From his right, Captain Blake observed the other DC-1 descending at a steep angle, he had not seen it previously.

Captain Blake indicated that a flight plan had been made out on the morning of May 17, 1951, which lists the names of three other pilots who required flight checks, however, since these pilots were not present at the designated time, the flight departed without them. Investigating showed that California had previously required a check list prior to reaching the range station, somewhat similar to Overton, but had discontinued it as they took a procedure at that point would direct the attention of the check pilot and require his watching for other aircraft. Also, the company did not normally require an observer to be seated in the observation, but since the accident this has been required on all training flights.

Sketches were obtained from a number of eye witnesses to the accident. Some are

the principle makes the principal difference



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not in maintaining an orderly flow and separation of traffic. Above the traffic pattern altitude, the tower operator does not normally exercise control under VFR conditions. At both levels, there are VFR flight plans they may not make contact of Air Traffic Control. Thus, aviation flight will under any present condition whatever at the time of collision, therefore, responsibility for preventing collision in this case was vested solely in the flight crew.

The Board has stated in aspects of process on evidence that pilots are charged with the highest degree of responsibility in maintaining a lookout for other aircraft. In fact, the Board's emphasis requires the utmost pilot vigilance at all times, not only as a pilot, but also as a pilot in command. Aviation Manual, set forth in part that:

"When flying in Visual Flight Rule weather conditions, regardless of the type of flight plan or no traffic clearance, it is the direct responsibility of the pilot to avoid collisions with other aircraft."

It appears that the board included in both aircraft and the general requirements of the CAA's Manual of Procedures, No. 4-11.

The crash in part:

"The applicant has an instrument not, we will assume a certified aircraft suitably equipped with a proper hood, but, in colored glass, . . .

"The new 'younger' hood is contrasted to mean a hood which will completely exclude all outside visual reference to the pilot an instrument yet not exclude outside visual of the safety pilot, agent, or observer. Sufficient visibility

to permit clearance for best in either direction, as well as adequate forward visibility is required. In straight flying a side-by-side seating arrangement is finding adequate visibility to the left, a safety observer will maintain a watch on the left. Such observer must be in unobstructed view or unobstructed contact with the safety pilot at all times."

However, following this accident, confusion to see the same type of hood. The company believes that this type hood offers a satisfactory degree of safety because it provides a reasonable amount of vision to the left by the safety pilot. The company further feels that when a complete observer is seated, as was the case when this collision occurred, there is ample vision ahead and to both sides. The fact that Owens was hooded did not in any way contribute to the accident. Owens in continuing to use a check list pilot to assist over the major portion of the initial approach. Company policy is to complete the checklist at an appropriate point of time before arrival over the target. Following the accident the CAA recommended that the observer select a different crew arrangement during training flights. The call for the safety pilot in the right seat to have no other duty than keeping continuous watch ahead and to both sides. The observer's jump seat would be occupied by the check pilot who would accomplish guiding the tower and handling the checklist. However, Owens continued using its former crew arrangement except that the observer is now stationed exclusively at the instrument. This arrangement was acceptable to the CAA.

California, immediately after the accident, revised its policy to require that the third crew member or observer on all instrument training flights be stationed at the instrument. It also changed its type of hood construction, using a revised set of bubble type hood, which provides a highly unobstructed field of vision to the left by the safety pilot. Later, following the aforementioned recommendation by the CAA, California again revised its crew arrangement, complying with that recommendation in full.

The Jan. 3, 1952, the CAA filed a report of violations of the Civil Air Regulations against the safety pilots of both aircraft. Captain Clark, (licensed) safety pilot of Owens, was charged with three violations of the CAA's. There are summaries in the violation report, to wit: "While on a simulated hood check the safety pilot and . . .

"Owens was CAA Section 61.12 (d), 61.14 (b) and 61.15.

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third crew member sitting. It is assumed, is another observer for records, failed to see the California Zivko C-14 and collided with it.

Clyde Stager, safety pilot of California, was observed during these maneuvers at the CAA. There are also mentioned in the accident report, to wit "19th mile south of Sacramento" and during a five-minute head-on, the safety pilot sitting in the right-hand pilot seat failed to provide a third crew member to supplement the safety pilot's normal view of the safety pilot." The CAA had some serious reports for record purposes only.

Both the Board and the Administrator, in respect to the industry and the military, have had the overall problem of all-time collision based on extensive study for some time, including the factors of support and control under NTS conditions. Concerning the latter, the Board is considering a requirement that all scheduled commercial (scheduled) flights operating in accordance with visual flight rules be under tower supervision at all times when within the airport control zone.

Inquiries of the lack of tower supervision, however, it is due to the Board that had the responsible crew members of both aircraft coupled with existing Civil Air Regulations and maintained the lookout required, this accident would not have occurred.

FINDINGS

On the basis of all available evidence the Board finds that:

1. Both aircraft, both aircraft and all five pilots were properly certificated.
2. Both flights were operating under visual flight rules from the Oakland Airport.
3. Both flights were for the purpose of giving aircraft instrument competency checks, with heads installed on the left side of both cockpits.
4. Overcast cleared an observer, as required, California did not.
5. Both aircraft were making unaided (visual) instrument approaches to the Oakland airport station at the same altitude.
6. The aircraft converged at an angle of approximately 45 degrees.
7. Overcast was a few feet higher than California.
8. No routine action was taken by either aircraft before collision.
9. Collision occurred at an altitude of 1,000 feet approximately over the Oakland airport station.

REMARKS

The Board determines that the probable cause of the accident was the failure of the Overcast safety pilot and/or his observer to observe and so avoid the other aircraft and the failure of California's major pilot to carry a qualified observer aboard the aircraft to insure an adequate field of vision.

By the Civil Aeronautics Board:

- (s) Donald W. Nyrop
(s) Gerald E. Ryan
(s) Josh Lee
(s) Joseph P. Adams
(s) Clara Chausy

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This comparison clearly reflects one of the difficult problems which had to be solved to build such immensely powerful engines as the J-57 turbojet. New engineering and development goals, new tooling and manufacturing methods, the forming of new materials into new shapes and dimensions—all depend on the technical skills of men and women.

Finding qualified employees with essential skills is only one problem. In addition, we train and coordinate these men and women—representing hundreds of new skills—into a smoothly working team. The complexity of modern aircraft engines and the dependability which must be built into them demands nothing less than the highest standards of American craftsmanship.



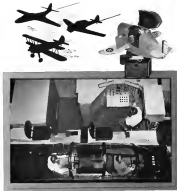
The above chart illustrates the huge increase in the number of different skills at Pratt & Whitney Aircraft from 1946, when only piston engines were built, to today when four different types of engines are in production or are being prepared for production. Demands for new skills, of course, are only one phase of engine manufacture. But the relationship illustrated here is typical of all phases of manufacturing the advanced, complex engines required today.

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LINK invites employment applications from engineers and technicians.

of the human pilot and/or make the human pilot against training of those individuals into simulators.

That latter assumption is most dangerous. The guaranteed retention of the "automatic" type of equipment instantly reduces the physical effort required of the human pilot but it does not significantly reduce the most producing mental stress in which is an approach under low instrument conditions.

The pilot who does not combine with understanding the functioning of automatic ILS representation may be sure of trouble some or later. The possibility of the installation of such equipment resulting in a deterioration of the pilot's manual operating performance should not be overlooked.

There frequently appears to be some lack of information on the part of aircraft designers and equipment producers of the basic utilization of the automatic ILS installation. Misconceptions are commonly discussed in regard to numerous of color and visibility under which an acceptable percentage of successful approaches will be probable.

Such predictions of percentage of successful approaches are often based on the assumption that the use of a single simple and low performance test procedure. It seems that the term "automatic approach" has been given distorted in the minds of some to imply that the equipment permits "automatic landing." Not so, at all.

One of the chief deterrents to a very high percentage of successful approaches by current high performance airplanes is the very low visibility down length of runway which have the facilities installed.

The ILS ground installation is normally fixed with the result that wind direction at time of landing may cause a downward landing runway which makes and visibility are sufficient to permit a VFR half descent of the field.

The link principle approach to downwind landings results in an increase in runway used in landing by a step. Also, the average placement of glide slope transmitters such that tow-planes is not accomplished at the threshold of the runway.

A suitable number of fixed approach and downwind landings may be achieved while the airplane is under radio control. All of these factors imply the necessity of longer ILS runway ILS approach to be projected to some low minimum.

S. E. Corbett,
3474 Kingsway Street, West
Beverly Hills, California
Wichita, Kansas

Mr. Corbett's excellent summary of the complexities and limitations of automatic ILS, and particularly automatic approach complex, should find wide agreement from among the engineers who design automatic equipment and approach complex.

When one uses the most realistic approach complex program would appear that the dealer can never be an excuse for his approach afloat training. Yet, it is the event of war, the military might be forced to lower its pilot qualifications and to reduce its pilot training period. In the event, automatic devices, when functioning properly, could partly compensate for the lack of pilot deficiency.

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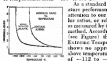
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¹ Polymer Eng. J., Ind. and Eng. Chem., Vol. 46, Page 1775, July 1952.
² Ind. Eng. Chem., Vol. 46, Page 1775, July 1952.

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production "upheld stress in the flight crew, the approach commander should provide more relief by giving the pilot more freedom to react far less direct control with the field."

If a pilot "maneuver with understanding" his controls during an emergency approach, as Mr. Gossel suggests, the cockpit need not cause demoralization of a pilot's normal approach technique. But Lutz says that the manual approach technique actually improved as a result of his experience in most losing the performance of approaches made with the Lutz computer. Lutz says, and others agree, that the computer gives the pilot the feel of how the controls should be maneuvered for a correct and smooth approach.—PETER KILKE

Collision Blame

As a private pilot with approximately 200 hours total time and a lightplane owner of an Antonov Selen, 1,800-hour pilot (with) time at lightplane (Aviation Week Apr. 30, p. 36) it has been a hell in even stronger to realize. The description of his duties is very important, and in particular, his omission of a thorough visual check of the airport around him.

The U.S. investigation of the South DC-4 crash at Lutz held clearly states: "In this case does not release the pilot of the responsibility of maintaining vigilance." In support of this statement, one of the probable causes of the crash states: "Error in judgment of the situation on the part of the controller was a contributing factor." What is to prevent two cultures from being as the same situation as always?

The cockpit living was limited to read the CTR report on who was in blame for the Constitution Cassia accident over Fort Washington, N. Y., on Jan. 30, 1949. It is 2,000 hours to make an action pilot answer to accidents and finally be well served?

One more question: How does pilot living approach a scheduled way where there are no critical times involved?

Mr. Lutz's attitude is analogous to the driver of a car speeding along a super high way with his eyes glued to the white line and never looking up to check what may be ahead before it is too late.

The private pilot all too often finds himself very much alone when trying to protect his rights, and will not when such up with the dirty end of the stick. Miss Kuznetsov and the NACA stand for us as a guarantee which is doing an excellent job in furthering the interests of the lightplane pilot and along cockpit reports in the interests of safety for all.

1,800 hours living is doing nothing better than trying to stick a knife in the back of that plane of aviation that gives him his last 100 hours. As for other comments on airline piloting, I would like to suggest that Mr. Lutz mail the answer to Capt. Roberts' article of Feb. 23 appearing in the same issue as his letter (Apr. 20).

WALTER S. POSE, JR.
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AVIONICS



IBM CALCULATOR involves 18 connected machines, including electronic control (center) and electromechanical storage units (left).



IBM RAND ERA 1103 is shown in model. It could be used for computing air traffic control, aircraft conditions or air defense.

Giant 'Brains' Could Aid Air Defense

Automatic computers would speed solution of aerodynamic, avionic and thermodynamic problems.

By Philip Klein

Two new large ultrafast automatic computers, one of them possibly slated for use in air defense interception problems, have been announced in recent weeks. Both computers are capable of speeding the solution of complex problems in aerodynamics, thermodynamics and electronics which are encountered in aviation.

• The 4,500-tube ERA 1103, a product of Engineering Research Associates Division of Remington-Rand, is scheduled for initial delivery to the Defense Dept. this fall for unclassified use.

• The 4,000-tube IBM 701 is already at work at International Business Machines' technical computing bureau in

New York where organizations can bring complex problems for solution.

► For Air Defense—The ERA 1103 has sufficient speed and suitable registers, a Remington-Rand spokesman says, to enable it to operate under "real time" conditions in the control of artillery and civil aircraft.

If applied to air defense problems, the computer could pre-digest data on the relative strategic importance of targets within the U. S., and the disposition of our interceptors and guided missiles, their speeds and capabilities. In the event of an enemy attack, radar networks could feed the computer with information on the location, distance, relative numbers and speed of such groups of an attacking force.

The number of factors which must be considered in quickly deciding on the disposition of our air defenses, particularly if the enemy uses heading tactics, is enough to exhaust the human mind. The ERA 1103 could solve the problem without any stress, almost instantaneously, Rem-Rand says.

Operating in conjunction with avionic equipment, on board the interceptors or missiles, the computer could automatically vector our air defense into position to attack the enemy force, and in the case of guided interceptors, could automatically aim them to lose in variable time important to avoid stacking at the airbase.

► Civil Traffic Control—A Remington-Rand spokesman also suggested the use of the 1103 computer to control civil air traffic in order to avoid support confusion.

Based on data received by ground

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Extra Rugged, Compact 400-Cycle AC Relay Offered in New AF Series

New AF Series, recently developed by Potter & Brumfield, will operate on any frequency in the general vicinity of 400 cycle with 15 points or higher contact pressure at approximately 2 V.A. input per magnetic pole. Advanced construction provides heavier leads than D.C. relays with any contact arrangement up to 2 Form C (SPDT) contacts.

New unit is available open as illustrated or hermetically sealed with 3-wire mounting and plug-in or solder-terminal glass-insulated bases. Coils wound on mold of helical bobbin with breakdown of 100 V. T.M.S. means extra insulation of contact contacts and to ground. Contacts rated 5 amps, 115 volts, 60 cycle, non-inductive load.



Ultra-Sensitive SS Series Feature Dual Coils; 10-G Vibration Resistance



Brand new SS Series, D.C. Super-Sensitive Relays, provide operation with 100 V. vibration resistance on less than 30 mV. New test vehicle dual coils actually contained in series. Reduced resistance with power hermetically sealed in replaceable contact relays feature to a maximum. Auto adjust contact tension 2 A at 115-V. AC or 20-V. D.C., near minimum lead. Contact arrangement in 1 Form C (SPDT). Available with lead solder terminals or 100-1000 ohm and sensitivity range from 1 mV to 3 W. Supplied open as illustrated or hermetically sealed with glass-insulated plug-in or solder-terminal bases.

Design Engineer Gets More Help to Meet Tough Relay Requirements

Shown on this page are some of Potter & Brumfield's recent relay developments. Continued research of our relay engineers offers design engineers more help in the fields of hermeticization, ruggedization, automation, higher voltage operation, more contact overhauls, greater sensitivity and longer life.

MH Series Offers Maximum Conversion Efficiency, Many Contact Combinations, DC or AC



Standard and mini versions of the telephone type relay, MH Series offers sensitive coil power, a wide selection of contact combinations and high contact capacity. Available open or hermetically sealed with maximum of 12 contact springs for either DC or 60 cycle AC operation.

Calls for both relays furnished up to a maximum resistance of 22,000 ohms for either current or voltage isolation, hermetic resistance better than 1000 megohms and breakdown above 300 V. B.M.S.

MJ Series Feature Longer, More Flexible Contact Arms; Lower Spring Load Rate, DC or AC



Newly developed MJ miniature telephone type relay features longer and more flexible contact arms which result in a lower spring load rate. This sensitivity permits wider contact gap, more overtravel, improvement in sensitivity, faster action and longer life. MJ supplied open or hermetically sealed, with maximum of 12 contact springs. For either DC or 60 cycle AC operation.

Hermetic Sealing or Dust Covering Available for All Individual Relays or Multiple Groups; Keep Out Dust, Fumes, Moisture, Etc.

■ New "L" Type drop-down steel end-mount hermetic relays: M31 relays or one mounted L2 10-point type relay, not shown on this page. Mounting is by 4 studs. Available with maximum of 24 contact terminals. Dim. .250" x .400" x .150" high.

■ New "D" Type drop-down steel end-mount relays: M31 relays or one mounted L2 10-point type relay, not shown on this page. Mounting is by 4 studs. Available with maximum of 24 contact terminals. Dim. .250" x .400" x .150" high.



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- Wide-Range Master Catalog Showing Full Line of Relay Products.
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transfers due to the electrostatic sensitivity.

Remington-Rand says its computer can extract numbers directly from either the electrostatic or magnetic drum sources for computation.

Access time to any word in the ERA 1103 electrostatic memory is quoted at 6 to 30 microseconds, and 14 milliseconds for one word in the magnetic drum. The 1103 apparently uses a system of "subaddress" addresses on the magnetic drum to speed up access time. With this arrangement, consecutive "addresses" are placed at staggered intervals around the drum rather than in consecutive positions around the drum. IBM says the access time to any word in the 703's electrostatic memory is 12 microseconds. Maximum access time to any word in the magnetic drum is quoted at 33 microseconds. However, access time to each of several consecutive words averages less than 10 microseconds, IBM points out.

Both computers are capable of transferring approximately 40,000 words per second from the magnetic drum into the electrostatic memory, or vice versa.

When the computers have finished with their "housework," the answer can be "read out" on a magnetic tape, punch tape, punch cards or on an electric typewriter. IBM quotes read-out rates of 1,070 words per minute on a 100 lines electric printer, or at rates of 1,250 words per second on magnetic tape.

■ **Mem-Hand Features**—Remington-Rand cites several ERA 1103 features



ORDNANCE EIRSTERN

Elcom BDA, Army Ordnance's new automatic computer, can handle 4,000 operations in a 45-hour period without a single error during initial acceptance tests at Aberdeen Proving Ground when the device still performs ballistic calculations. A product of the Underwood Corp., Elcom BDA is reportedly capable of making 1,700 computations per minute and has a storage capacity of over 100,000 also-digit "words." Cost will be under \$200,000.

that reportedly account the machine's speed and speed of computation on certain types of problems. For example: ■ **Multiple-add command.** One of the 1103's 15 different types of orders is a command called a "multiple-add" command and it is particularly useful in performing matrix multiplications, Rem-Rand says. When used, this single command will cause the machine to multiply two numbers together, consecutively store the product, multiply two other numbers together, and then add this product to the previous product, giving $(A \times B) + (C \times D)$.

■ **Repeat command.** This command is used when the operator wants the com-

puter to repeat the same operation many times. It eliminates the need for programming many identical single-operation commands, Rem-Rand says. ■ **Address System—RAM** has designed its Model 703 to operate from a "single-address" command, while the ERA 1103 uses a "two-address" command. A single-address command tells the computer where to find the number it needs, a two-address command does this and also tells the computer where to look for its next operating instruction.

Once a many single-address commands can be stored in a given memory capacity, but the two-address command gives the computer operable order first.



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due in programming a problem.

► **New Computing Center—Rensselaer:** Rensselaer is set up a computing center this summer at its New York headquarters. The center will be equipped with the older Rem-Rand Univac and an IBA 1101, and eventually with the new IBA 1103. The center will be available to students for solution of complex problems and will also be used to loan service and operating personnel.

Delta IEM, which sends its computer about 512,000 a month for the 7001 Rensselaer-Rand will sell its own IBA 1101 (approximately \$500,000, installed).

Small Components

Recently announced miniature and subminiature components designed to help engineers cut the size and weight of various equipment include:

► **Sealed relay:** Bourns and Glen S relay which operates under MIL-B-6190 is now available in heretofore



sealed enclosure. Unit weighs under 2 oz. (Automotive Electric Sales Corp., 2015 W. Van Buren St., Chicago 7, Ill.)

► **Pulse network:** Pulse-forming network for radio, telemetry, or transfer bus is



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rubberized printed resin and can operate between -45°C and 165°C, the same factory reports. List is 4 1/2 inch in diameter and 1 1/2 inch long. (PCA Electronics, Inc., 6166 De Langue Ave., Hollywood 33, Calif.)

• **RF interference elim.** Action Corp. says it has cut the use of its RF interference elim 40% to 50% by switching to metalized paper capacitors and



high permeability core materials for filter inductors. Filters are available in single or multiple sections for suppressing conducted and radiated noise between 10 Hz and 1,000 mc. Filters reportedly meet military specifications (Action Corp., 213 Genl Ave., East Newark, N. J.)

FILTER CENTER

► **New High Accuracy Navy Radios**—A new type of automatic tuning radio developed by General Electric has its potential exhibited extremely high accuracy in Navy reception tests. New value is suitable for aircraft use.

► **As Finest Buy New Transceiver**—An Finest will soon take delivery of 50 of the recently announced Collins Radio 6155 144-channel HF transceiver, automatic power supply and 130L-2 automatic antenna tuning unit (Aviation Week Sept. 15, 1952, p. 50).

► **MEM Gets Navy Autopilot Award**—Memphis Instruments, Inc., a major USAF autopilot supplier, has reportedly received a contract to develop an advanced type of autopilot pilot for the Navy Bureau of Aeronautics.

► **New Technical Bulletin of Interest to the avionics industry**

• "CW Methods" recommended assembly and wiring procedures for AN, BF and special-type electrical connections are detailed and partially illustrated in 49-page manual available from Dept. 173, American Flamingo Corp., 1950 S. 94th Ave., Chicago 16, Ill.

• Knowledge obtained of the direct-current type, cathode ray oscilloscope computer or telemetering system, are described in a two-page bulletin which includes performance data and specifications. Bulletin Co. 114, Delcon St., Cambridge, Mass. —PK

May's in Bloom

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RUBATEX AT WORK . . .

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- Lamp sockets
- Heated seat cushions
- Cool gear levers
- Window protectors
- Fuel cell cushions
- Floor mats
- Air-sealant pads

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- Expansion joint seals
- Weather stripping

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- Instrument gaskets
- Battery mats
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- Duct proof seals
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- Gaskets
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You can figure out the savings yourself. Find out what it costs to operate your company aircraft for one hour. Find out how many hours it flies in a year. Then calculate how much Bendix Distance Measuring Equipment can reduce operating costs . . . even if DME saves you only one minute per hour! Here is a navigational aid . . . that produces possible savings in fuel consumption, more accurate ETA's, better holding procedures, expediting arrivals and departures, etc.



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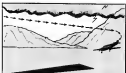
Ground and airborne equipment work together in DME. The airborne receiver transmits a known signal to the ground station, always located at a VOR site, known as a transponder.

The interrogator in the plane radiates a series of radio pulses. They are received at the ground station . . . where they trigger the ground transponder. This in return transmits a reply to the plane. The elapsed time, in micro seconds, is used to compute automatically the exact distance between the plane and the ground station. The pilot simply reads the exact distance on the panel indicator.



UNMARKED AIRWAYS

Pilots of corporate aircraft will be able to navigate along new and unfamiliar routes with greater accuracy and with more confidence under IFR conditions. They will not have to fly standard routes which often add many miles to the trip. Here's another DME saving in fuel and time.



INSTRUMENT APPROACHES TO FIELD

To the operator of executive or corporate type aircraft, the advent of Bendix DME equipment means that many small airports which are within operating range of a VOR/DME but are not served by scheduled carriers and normally difficult to approach on instruments, will now be open to him. DME equipment in conjunction with VOR equipment provides the pilot with continuous accurate distance and direction information without time consuming triangulation or mathematical calculations.



ORBITING

Dependent of wind conditions, a pilot is now able to fly an accurately controlled circular course. This exact arc can be flown around a DME/VOR at selected distances from the station and at varying altitudes. This expedites departures and arrivals. It bypasses holding stacks at intersections. It all saves time, fuel and money.

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MORE ACCURATE ETA'S The Bendix DME shows the pilot to estimate arrival times more accurately. Flight tests prove that a pilot with DME on his instrument panel can correct for headwinds, tail winds, etc. He simply calculates he always knows his ground speed. Whenever the change . . . the pilot can adjust his power to maintain his provided ETA. Accurate ETA's reduce holding and altitude-changing along the way. They reduce wasteful time expenditures save time, money and increase passenger convenience.

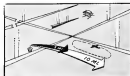
DISTANCE MEASURING EQUIPMENT (DME) has long been wanted by the aviation industry to provide rapid, precise determination of the location of aircraft in flight. As its name implies, distance measuring equipment electronically ascertains the distance of an aircraft from a specific ground DME/VOR (Veece Ocker Range) station and presents the numerical value on an analyzer calibrated directly in miles. This reliable reading, when combined with the lateral directional information from VOR/Veece Ocker Range stations, provides the pilot with simultaneous distance plus direction data . . . all that is required to immediately and accurately pinpoint his position. Bendix Radio now offers the aviation industry the finest in Distance Measuring Equipment . . . designed to meet precise, reliable navigational information in high intensity areas and under the most adverse weather conditions.

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With Bendix DME, aircraft can now hold at any point within range of a DME/VOR station. No longer limited to single intersection facilities or known strong markers. Patterns can be tighter, closer in, more accurately executed. Holding can now be on actual distance covered, not an elapsed time. No more need for wasteful wide-area "Doodle Zones."



The Bendix antenna is about the size of a pack of cigarettes. It can be placed anywhere on the aircraft.

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► **Profit Margins**—The profit margins, before and after taxes, for the individual aircraft companies are measured by Aviation Week in the table on page 76. It can be seen that profit margins before taxes range from a high of 9.7% (Cessna) to a low of 4% (Lockheed, Martin, and Northrop).

Profit margin percentages, after taxes, for the aircraft companies, range from a high of 4.0% (Martin) to a low of 1.3% (Northrop). The Martin, showing, however, is a factor in the company was not subject to any adverse tax due to the carry-forward tax credit arising from substantial losses of previous years.

Early heavy accelerated amortization charges on new plant facilities has also reduced the tax burden for McDonnell, which faced a beneficial reduction in a higher net profit margin as so exacting the liability was increased last year.

In the meantime, McDonnell's overall effective rate of 16% was low for the aircraft group. Boeing was high, with Cessna, Fairchild, Cessna and Republic close behind Martin, of course, and no income tax in 1952 as previously explained.

The 3.8% profit margin after taxes for Cessna/Wright and Cessna, operating 1952 earnings without special adjustments, may be regarded as the best in the industry last year. United Aircraft followed next closely with 2.7%. Significantly, in all three of these instances, commercial business contributed importantly to earnings and probably accounted for the better profit margins.

► **Margins Lower**—Almost without exception, profit margins after taxes for the individual aircraft companies were lower in 1952 than for 1951, continuing the declining trend in effect to recent years.

Substantial increases in volume deliveries for 1952, of course, accounted for higher earnings in the industry. This is the inevitable least-cost consequence of the past cooperation of the previous long and early preparation period during which tooling up, training of personnel, and the assembly of materials and components must take place before volume output at profitable levels can be reached.

While the overall profitability for the aircraft industry represented a very good showing for 1952, the group's earnings record must be viewed over a longer period of time than one or two years for proper perspective. Only in this manner can the industry's financial ability to meet demands dictated by national defense requirements be properly evaluated.

—Selig Altschul

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These hose assemblies can help you achieve better design in engine and aircraft "plumbing" systems. Fitted with forged aluminum, integral elbows, they're interchangeable with combinations of conventional hose assemblies and adapters—thereby giving you convenience with less parts, less weight—and less chance for possible leakage.

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OFF THE LINE

Went for FAA to install a **Boeing** NA-5 and Federal D1A turbine engine, equipped with one of its DC-14s for service evaluation tests. The company is now testing the equipment plus a **Boeing** Model 1110 DME set on a DC-14 in the New York area.

Vickers, Inc., has introduced a new jet engine turbine that use oil and the oil of lubricating jet fuel controls to one

effect of their present value. The device, developed in cooperation with Navy's Bureau of Aeronautics, maintains flight conditions without the use of a jet engine. Vickers says it has a substantial production contract from **Boeing**.

Winged Instrument Co., aircraft distributor and repair division of W. J. Connell Co., has moved to new facilities at Newton Upper Falls, Mass., headquarters of the parent firm. The company, formerly located at Norwood Airport, Mass., is equipped to handle repairs in a wide range of aircrafts.

For Parts that must be TAKEN OFF—PUT BACK—BUTTONED TIGHT LION FASTENERS



LOCKS TIGHT WITH A QUARTER TURN Always at correct tension

Use **Fasteners** are tight for fastening parts that must be removed frequently for inspection, maintenance, or other reasons. **Fasteners** and **locks** won't loosen in time. **Fasteners** are in (unintentional) service and can't replace it. **Fasteners** are in (unintentional) service and can't replace it. **Fasteners** are in (unintentional) service and can't replace it. **Fasteners** are in (unintentional) service and can't replace it.

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and astronaut. For convenience of customers flying into Newark, Bayport, or Bedford Airports, arrangements have been made in equipment can be left for repair with Service Division of Wing Airports or Night Aircraft Co.

Lockheed Aircraft's Turbo Compound-powered Super Constellation, soon to go into service on the Pacific Northwest and Atlantic routes, will be equipped with **Pratt & Whitney** fuel pump systems made by **General Motors**.

Eastern Air Lines' fleet now totals 106 aircraft, including 66 **Boeing** 48-8 and 30 **Super Constellation**. An additional 60 **Turbo Compound-powered Super Constellation** will be delivered this year, will bring the total up to 120 aircraft.

Two Fox American World Airways Constellation are being modified into 70-passenger aircraft by **Trucon Aircraft Corp.**, Dallas. Modifications give include removal of the plane's single galley and installation of two food service facilities, rearward-facing, relocation of radio equipment, installation of double windows, putting in an air conditioning and remote of heater ducts, rewiring wiring, complete wing overhaul, and completion with all latest engineering alterations.

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NEW AVIATION PRODUCTS



Tower Operators Now 'See' Better

A new photoelectric system provides an exact measurement of visibility at airports and may narrow considerably the disparity in outlook between pilots and tower operators during landing approaches, according to its maker, Coarse-Grained Co. C-G developed its under contract with the National Bureau of Standards.

Based on original NBS designs, the equipment, known as a Transmissometer, was perfected after years of testing at Ames, Calif.

It is being marketed at military field use, and eventually will be available for commercial operations. Two sets, in fact, already are in operation at Los Angeles Airport. The Civil Aeronautics Administration has proposed its structure and charts enabling tower personnel to translate data provided to the set into a direct measurement of horizontal line-of-sight visibility.

The set also can be used to control runway edge lights so that, opposite each other, at various distances, depending on fog conditions, among other variable applications.

How It Works: The Transmissometer projector sends out a concentrated light beam picked up by a lens system at the receiver 900 ft away. The beam is focused into a photo-electric element and transformed into an electronic signal which is amplified and transmitted from the receiver to the indicator in the tower. The projector and receiver each have their own power supply.



SCHEMATIC of Transmissometer

The Transmissometer consists essentially of a light beam projector and receiver, normally spaced 900 ft apart over the runway threshold, looked up with an indicator in the tower.

The system gives a direct picture of visibility at the approach, regardless of tower location. At large airports conditions at the tower and those far down the field at the runway approach may vary widely. The tower may be obscured in fog, yet the approach may be relatively clear. With only two eyes to determine line-of-sight visibility, the tower operator may conclude that a landing would be unsafe, yet he sees, he only obscured in a weak mist at the tower.

The new set would enable the operator to ascertain accurately approach conditions even if the tower were located 10 miles away, Coarse-Grained claims.

The set also can be used to control runway edge lights so that, opposite each other, at various distances, depending on fog conditions, among other variable applications.

How It Works: The Transmissometer projector sends out a concentrated light beam picked up by a lens system at the receiver 900 ft away. The beam is focused into a photo-electric element and transformed into an electronic signal which is amplified and transmitted from the receiver to the indicator in the tower. The projector and receiver each have their own power supply.

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Patented hydraulic copying attachment for milling machines permits negative machining of complicated shapes, such as turbine blades, in both small and large runs—Morris Markens Co., Inc., 609 Racine St., New York 13, N. Y.

Eclipse NR-513 cyclone resin collector handles two pounds surface, metal, glass, ceramics, rubber or synthetic resins, collects maximum chemical, high dielectric and mechanical strength and high heat resistance. It can be used with lenses as it is transparent—Boscon Co., Chemical Div., 536 Madison Ave., New York 17, N. Y.

Heat-treating furnace maintains temperatures up to 3100F., includes water-jacket chamber to assure cooling of work before oxidation point before it is discharged, protective atmosphere provided by hydrogen or disassociated monomers—Worthington Electric Corp., Box 1206, Pittsburgh 32, Pa.

Adjustable cage for punch presses insures operator safety but doesn't interfere with production operations. Vertical rods can be dropped through holes in presswork horizontally and locked in place and held in any position by clips to secure openings for placement or removal of parts of various sizes and shapes—Brenthamer Mfg. Co., 1835 W. Roosevelt Ave., Garland, Calif.

Faster travel speeds, fewer "pitch ups" and stronger welds are possible with new quick starting, 400-amp a.c. welding transformers suitable for light and heavy-duty work. Arc stabilizing capabilities make it easier for operators to strike and maintain electric welding arc, without "pop-outs"—General Electric, Schenectady 5, N. Y.

Mercolin No. 1, a polyethylene liquid that can be sprayed or brushed and will not run off vertical surfaces, solves hard-to-apply problems in producing transformers by allowing in place during working of various parts, such as rotor cores. It holds coils in place in close contact with wind surfaces or other places around sharp bends—Mason Chemical Inc., 1771 Elizabeth Ave. West, London, N. J.

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Consistencies of 299 lamps made by
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military truck numbers, USAF 5879
series, Naval aviation, RAF and AN
past numbers. Write the company at
461 Liberty Ave., Box 2274, Pittsburgh
20, Pa., or any of its branch offices
for Form 5-62.

Permanent-magnet action are de-
scribed in Bulletin P-614, being dis-
tributed by Butler-Colman Co., Roch-
ester, Ill.

Machine tools, cutting tools and
pages available to industry from Pratt
& Whitney, divisions of Niles-Bement-
Ford Co., are described in new folder
sent out by the firm. Address in West
Hartford, Conn.

Gap-frame double-crank gears and
a new articulated electrolytic controlled
clutch are described in Bulletin
65 B being sent out by Niagara Ma-
chine & Tool Works, 637-697 North-
brook Ave., Buffalo 11, N. Y.

Jet black profiling machines which
mill, grind and polish contours of air-
craft turbine blades are covered in Bul-
letin 20620 available from E-Cut-O
Corp., Detroit, Mich.

Subminiature valve with flaring stem
and, incorporating principles used in
design of a valve for the Republic P-54
Thunderbolt's fuel lines, is fully de-
scribed in a 12-page brochure being
distributed by Valco Engineering
Corp., Carnegie Ave., Kenilworth, N. J.

Worm-reducer alloy ball-bearing center
for worm controls also can be purchased
adapted with new centers, deceleration
and speed for 16 sizes are covered in
Bulletin C1-32 available from Denham
& Co., 927 Bank Building, Detroit 26,
Mich.

Continue above data including cutting,
bending and shaping of metal parts is
covered in Catalog 13 by White-Steigel
Corp., 145 Payne Ave., North Yonke-
rville, N. Y.

New Book

The Amazing Mr. Doobit, by Quin-
to Revocable, published by Appleton-
Century-Crofts, Inc., 35 W. 57th St.,
New York 1, 1949.

Amazing is a very mild word for
James Herriot Doobit. Puggins, dave-
dov, second location-Jimmy Doobit's
early life would seem to give little hint

IT'S AEROPROPS- FOR TURBOPROPS!

Powerful Allison Team Used in all Four U. S. Turbine-Propeller Planes

Turbine-driven propellers solve many urgent
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Out in front and pioneering to prove the place of
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with included contra-rotation Aeroprops and
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General Motors' contribution to the pro-
cessing of turbines and propellers in a broad band
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The difference between Life... and Death...



"Why should you give blood?"
 Ah! now I ought to know. I bought in Korea. But since then I've been through the biggest battle of all—the battle for life itself. And it was blood—red blood—that saved me. Don't know when I'll be in a position to start repaying my debt by giving some blood of my own. But I will—some day. You can count on it!"

All kinds of people give blood—for all kinds of reasons. But every reason for giving blood is a special reason... just as every American life that can be saved at any time and at any place... is special. So whatever your reason for giving blood, that you can be sure of: Whether it goes to a combat zone, a local hospital, or to Civil Defense needs—that precious gift will some day save an American life!

Give Blood Now
CALL YOUR RED CROSS TODAY!
 NATIONAL BLOOD PROGRAM



Business Executive! ✓ Check These Questions!

If you can answer "yes" to most of them, you've done your duty every day in doing a needed job for the National Blood Program.

- ☐ Have you given your own physical test of fit to make blood donations?
- ☐ Has your company given any recognition to blood?
- ☐ Do you know a Red Cross Blood Bank is in your company?
- ☐ Have you arranged to have a bloodmobile make regular visits?
- ☐ Has your management endorsed the local Red Cross Blood Program?
- ☐ Have you indicated this physical test your company's plan of responsibility?
- ☐ Was this information given through Plant Bulletin or Memo Magazine?
- ☐ Have you participated in a Donor Ridge Campaign in your company?
- ☐ Have you set up a list of volunteers in that all-time plan can be made for scheduling donors?

Remember, in doing so, it is a single act of blood that saves the difference between life and death for any American... the need for blood is urgent!

of the late Douglas Aircraft Company as engineer, AAF lieutenant general, government consultant, aviation bloodmobile. But in this biography points out, all of the man's apparently hard-bitten policies were based on planning and carefully calculated risks.

During the first outside loop, completely blind instrument landing, height and landing (in 1925) the machine and on Tokyo—all examples of Douglas's extraordinary courage and ability—none yet calculated risks to him. After thorough study contacted him some thing was possible he was ready to go.

The book tells an extraordinary tale about the Tokyo raid. It is suggested that Navy's Adm. Francis Low then a captain, who told it to Adm. King, had brought it to Adm. Douglas (also a captain at the time), who thought a carrier raid against Japan would work out if B-29s were used. When Gen. Hap Arnold was informed of the plan, he asked on how Douglas decided to choose a plane with the necessary capabilities. Douglas did not know of Douglas's opinion (one of about 15 B-29s took off from Douglas had contacted), but he did not know.

Major of Douglas's staff, his carrier flying in World War II, his carrier's crash, was a danger to his life. But his whole career appeared to hang for a while on his decision to have Shell Oil Co., of which he was a director, spend millions of dollars in co-sponsoring high-intensity gasoline facilities. He insisted that better performance of aircraft depended on the higher quality fuel, although commercial aircraft fuel at the time was generally non-existent. World War II came along, and the nation learned that this was another Douglas gamble based on sound thinking.

The life of the man is so varied and interesting, it is a pity the book is not better. It reads like one of the many popular biographies dashed off in election years. Proof readers familiar with aviation could undoubtedly have caught the many typographical errors and the misspelling of such well-known aviation names as Looney, Keys and Netherby. —F.L.

Product Literature

Cushion blades, tools and toolholders, inserts and technical data on cushion and its use, complete information for ordering and price, are detailed in Catalog VIK 941 available from Viceroy-Ramco Corp., Washington, D.C., or any branch office or distributor of the company. . . . Thread plug and ring gap information on a practical plate is contained in booklet being distributed by Thread Gauge Co., 16510 W. Santa Mesa Rd., Detroit 24, Mich. . . . Values for operating air and hydraulic

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Coupled cylinders and air meters in hand, foot, power- and vacuum-operated models are described in Bulletin 1030 which can be obtained from Latham Mfg. Co., 1620 S. San Pedro St., Los Angeles 44 • Check your pocket, Type DBL for production line work, is covered in illustrations, sketches, design details and application in 26-page Catalog No. 52 being mailed by Latham Tool Co., Waukegan, Ill.

High-pressure hydraulic cylinders designed for working pressures up to 2,600 psi are covered in Catalog 101 Eleven models are detailed. Write S.P. Mfg. Corp., 12415 Euclid Ave., Cleveland, Ohio.

Machine tools as well as small process tools and measuring equipment of U.S. and European manufacturers are listed in 24-page catalog being distributed by De Witt Equipment Co., 35 Lafayette St., New York 13, N.Y.

Inspection equipment, including X-ray cameras, fluorescent magnifiers, micro-lights and similar equipment in more than 80 different types, are listed in a bulletin prepared by Arthur S. La Pore & Co., 600 S. Kent Ave., Chicago 27, Ill. Surface damage measurement by means of light beam readings is detailed in vertical board bulletin available from Crane-Pickens Co., 1800 Center Ave., Chicago 13, Ill. The bulletin is designed to be used as a wall chart.

New Film

History of Aviation, a 16 mm. sound educational film produced by Walt Disney at Technicolor. Available on serial loan from Smack Motion Pictures, Inc., St. Louis 5, Mo., and Cinema, Inc., 324 Broadway St., Boston 18, Mass.

Publications Received

- **Elements of Telemetry and Helicopter Avionics**, by David O. Domanick, ed., by Pitman Publishing Corp., 2 W. 41st St., New York 18, N.Y. 34 pp. Provides basic pointing equipment and includes the basic principles of helicopter theory.
- **Television and Radio Receivers**, by W. MacLachlan, ed., by Pitman Pub. House Corp., 2 W. 41st St., New York, N.Y. \$5.00. Up-to-date guide to the principles, practices and technology of television and radio.
- **Materials Handling**, by John R. Tomlin, ed., by McGraw-Hill Book Co., Inc., 1221 W. 42nd St., New York 36, N.Y. \$5.00. Describes specific methods of handling, it discusses the underlying characteristics can use to solve handling problems and offers many of methods handling equipment has in use.
- **Mechanical Inspection**, by John R. Tomlin, ed., by McGraw-Hill Book Co., Inc., 1221 W. 42nd St., New York 36, N.Y. \$5.00. A manual of precision inspection for metal working machines, related tools



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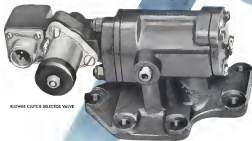
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ADEL

AIR TRANSPORT

PAA '52 Profits Hinge on New Mail Rate

- Final pay could double or wipe out earnings.
- Carrier's vast holdings complicate CAB ruling.

Pan American World Airways reported \$6.7 million net profit for 1952, but total PAA earnings will not be known until Civil Aeronautics Board sets final subsidy and rates for the dominant Atlantic and Latin American Division.

Even when CAB determines final mail rates, slated for late this year or early 1954, few persons outside the company will know what Pan American earned. The carrier does not report earnings of its 46 affiliated and "associated" companies, shown on the PAA balance sheet as "other assets."

Double or Nothing—(1) repeated net profits of Pan American from 1948 through this year can change radically because of the leverage of mail revenues on the reported income profit margin.

A comparatively minor change in reported mail pay of \$16 million could either wipe out or double the reported \$6.7 million net profit for 1952.

If the Board ultimately grants a 7% to 10% return on stockholders' reported \$99-million capital and earned surplus investment, PAA earnings could jump to \$18 million or more.

But it all depends on what CAB decides to award as transport investment for U.S. subsidy purposes. It's further complicated by Pan American's vast equity in affiliated companies.

Yesterday, 74% of Pan American's \$6.7 million net profit came from the two relatively small divisions on fixed mail rates—the Alaska and Pacific Divisions. The parent Atlantic and Latin American Division still may be on temporary mail rates, set by CAB to break even or not yield a profit. When CAB sets the final rate, it will include a "tax return on investment" for PAA's portion as plus the rateback income in the Atlantic and Latin American Division.

Here's how Pan American's four operating divisions fared in 1952:

• **Fixed mail pay.** Alaska Division: net mail revenue \$5,565,000, net pay \$1,163,000, net profit \$127,000. Pacific Division: net mail revenue \$26,670,000, net pay \$11,467,000, net profit \$4,381,000.

Pan American Financial Status			
(As of Dec. 31)			
Assets	1952	1951	
	million	million	
Current	\$12.1	\$7.2	
Investments & special funds	31.1	31.1	
Other property held	94.0	5.4	
Deferred charges	38.1	26.7	
Intangibles	0.7	0.7	
Total assets	\$206.0	\$149.9	
Liabilities & Capital			
Current	\$62.0	\$59.1	
Long-term debt	28.0	77.2	
Deferred credits*	9.0	8.4	
Operating reserves	4.5	4.1	
Capital stock	9.1	6.1	
Surplus	92.6	97.4	
Total	\$205.2	\$192.9	

* Deferred credits include capitalized interest income from air transport mail pay. \$141,000 in 1952; \$141,000 in 1951.
Source: Bureau of Census. CAB. Allowance among airlines (other than Pan American) for mail revenue (in the United States) in 1952 (other mail rates are shown in brackets). Total assets 1952: \$206 million; 1951: \$149.9 million.

• **Transport mail pay.** Atlantic Division: current revenues \$18,011,000, net pay \$12,618,000, net profit \$1,565,000. Latin America Division: net revenues \$79,508,000, net pay \$10,416,500, net profit \$990,000.

Balance of consolidated Pan American profit came from transportation, non-divisional revenue and expense.

• **Other Profits—CAB** counsel is the Atlantic mail rate case, proposed to award dividends from Pan American Divisions and other investments in all acts to subsidy mail. Previously, CAB decided to include such railroad mail pay earnings from rate-making jurisdiction.

Most important feature precedent on this was the Board's decision not to count the carrier's profit on sale of Chase National Aviation Corp.

CAB counsel now challenges the former concept of keeping books all of airline's airline business. Even if the Board goes along with the proposal, the decision will have little immediate effect on Pan American's fixed mail pay and reported earnings.

• **The Board** could not count any earnings except dividends actually paid to PAA. If subsidiary companies keep showing book earnings into further periods, they don't count in Pan American profit.

• A dividend paid to PAA would not be offset to subsidy mail unless it

amounted to more than a 7% return on Pan American's investment in the affiliated company.

Pan American laid its Dec. 31, 1952, net investment on affiliated and associated companies at \$67,713,701—almost identical with the investment reported the year before. These investments generally are shown at original cost and do not reflect yields appreciation of value through changing book earnings.

Outstanding examples:

• **Passage.** The 50% ownership of Pan American-Guest Airways shares on PAA books at original cost of \$190,000. Passage earned \$1 million in 1952, and has net worth of nearly \$1 million.

• **International Hotels Corp.** Pan American's 100% ownership of IHC shows a \$3-million book value. But the worldwide hotel chain has individual hotels worth considerably more.

Other of Pan American's approximately 46 affiliated and associated companies include:

• 98-99% owned: Air de Montreal Pan American Argentina, Pan American Air France, Pan American Airports Corp., Pan American Airways, Alcoa, Ltd., Unkos, Mellon & Central Airways, Inc. Book cost to PAA is listed as \$185,000. Shareholder: Aeropostal Pan American de Mexico, Glaciar Hatch Book value: \$237,000.

• **Approximately 49-50% owned:** Aero-

	1992	1991
Operating revenues ⁽¹⁾ (in \$)	\$181.6	\$173.3
Operating expenses	137.0	153.0
Net operating income	44.6	20.3
Net nonoperating income	4.2	4.2
Net before income tax	48.8	24.5
Income taxes	4.4	3.7
Net profit	44.4	20.8

Beginning of year	524.6	\$10.2
Add net profit	67	65
Adjustments (add)	0.6	—
Less dividends	91	51
End of year balance	298.2	24.6

* Domestic products: 100 075-000 01 00 will serve for both and for human use

Analysis: Caribou's share is equal to 0.64. Reported Spruce Diox has spending income through net gain and surplus are identical with the income report to shareholders, but the latter includes certain additional revenues and expenses that other cash flows, including some net operating losses. Total spending revenues reported to shareholders: 1981, \$600 million; in 1982, \$617.5 million; 1983, spending revenues \$118 million and \$170 million negatively.

(Aircraft owned and as ordered)

Summary statement

Number	Type	Original Cost (each space pair)	Value Depreciated (as of Dec. 31, 1912)
28	Range Rangesman	\$16.9	\$23.0
16	Double DC-10	16.0	17.5
16	Lockwood Corollations	12.7	1.2
29	Double DC-4	8.5	1.4
14	Corvus 2-60	3.0	3.6
12	Double DC-3	1.9	0.1
1	Double B-75 trainer	9.2	—
318	Total planes owned	\$88.0	\$47.8

kayser@cs.wisc.edu

17	Douglas DC-6B
1	Douglas DC-6A
1	de Havilland Comet 1
33	Total no. seats. Cost \$45 million, with most paid

river de Mexico (book value \$350,000), Aztec Puerto de Biquira (book value \$215,000), Aerostar Nacional de Colombia (\$2,357,712), Bermuda Development Co (\$199,832), Aerostar Venezuela (\$223,000), Calles de America (\$420,000), Mineros de Avacion (\$523,000), Dominguez de Avacion, Financiera de Avacion, Liberia Development Corp (\$50,000).

The American has control or near control of most of the companies and can play back their earnings indefinitely without receiving dividend payments.

Incentives for withholding these earnings and capital appreciation from CAG consideration in PAs, profits and loss are five-fold:

• **Original investments.** Some go as far back as the 1930s. They can be shown to be outside the subsidy part of Pan American's investment and are

subject to U. S. consideration in future subsidy rates.

• **Foreign investment and operations**
Considered worthy of further stimulation
in the interest of national defence
and trade

- **Risk of foreign investments:** This is risk that book value may be often inaccurately limited to original cost, or less.
- **Simple exchange restriction:**

■ **Book Value**—As with many other revalued values, Peru American's stock market value is substantially lower than its book value.

Recent stock questions for the airline range from \$10 to \$12 a share, but the reported Dec. 31 book value per share was about \$16 (not worth \$99 million, with 6,143,852 shares outstanding).

• **Flight Equipment**—Pan American's flight equipment and other operating property is reported at net book value of \$244 million. Book value of flight

equipment and spare parts alone at \$41 million, written down from original cost of \$152 million.

With 18 Douglas DC-8s already delivered, FAA has 27 more DC-8s, three componenter DC-8As and three jet Caravelle still on order. The Douglas DC-8 rapidly is becoming the backbone of Pan American's fast Low-cost, high-service operation of 85-passenger DC-8s across the Atlantic is Pan American's major bid to achieve Trans World Airlines' claim of being the "lowest-cost trans-Atlantic operator."

Advance payments by Dec. 31, 1952, as the undelivered fleet totaled \$7,478,000, with \$35,630,000 still to be paid on delivery. Of that balance, Pan American reports that it expects to pay \$13.6 million this year.

Deutsche Lufthansa, former German national airline, expects below average to arrive government authorization permitting the new passenger carrier to resume operations.

Immediate problem will be equipping the reactivated unit, which reports to units between 20 and 24 aircraft. Exactly what equipment will be bought still is questionable. Consolidated Vultee reported in January (*Avtar* Week Jan 19, p. 75) that the stroke had been negotiating for five Convair 140s.

► **Flood Negotiations**—State Department officials indicated the subject is considering both the MLI and the Victims' Victories for domestic violence European states. The Council, DC-18, State-america and Super Courtchildren are being given equal consideration for the lower level Atlantic fish.

Lufthansa, once a leading European airline, is without equipment or routes. But operations plans have been meticulously worked out. A few pilots have been recruited and some ground personnel working for foreign airlines in Germany only await word that Lufthansa is beginning operations to start their jobs and join the new German flag line.

All that happens immediately upon signature of the German line is ratification of the peace treaty with the Allies by the Federal Republic's Bundestag (parliament) at Bonn.

***Route Plans**—According to preliminary plans, Latham hopes to be operating in Europe by 1954 or 1955. First schedules would link Caracas with London, Paris, Amsterdam, Brussels, Stockholm, Copenhagen and Zurich. A possible stop on the inauguration of trans-Atlantic service to New York and Rio de Janeiro, routes from which the airline can earn necessary dollars.



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1953 The Golden Anniversary Year of Powered Flight
1903 ESSO Experience in Aviation Began with the Wright Brothers in

AA Favors Turboprop Airliners

American president says they are a better answer to U. S. transport needs than pure jets.

By Robert Blotz

A significant shift to the turboprop engine as a better answer to future airline requirements than the turbojet has been forecast by C. R. Smith, president of American Airlines, one of the largest domestic airline firms.

Smith's strong support of the turboprop-powered aircraft is a speech at the Syracuse University Transportation Forum, is expected to have its accompanying implications in the airline and engine industry. Prospects for half a dozen turboprop aircraft projects now in various stages of development appear considerably brighter.

A reconnaissance poll was cast in the future of the West Coast manufacturers' turboprop transport plans.

Objective View-In plugging for the turboprop engine as the next stage of airline transport development to succeed piston engine transports, Smith warned that any attempt by the domestic airlines to jump directly to turbojet transports would confront the transport industry with grave financial problems.

He admitted that U. S. international airlines may be required to operate turbojet transports to meet British competition, even though the latter transports are economically advanced. He urged the domestic airline industry to take a more objective view of the new equipment problem.

"There is an competitive spirit about the domestic operators; but close and specific aircraft with a few economic potentials, and there will be some other they provide it," he said. "Any advantage gained by a domestic competitor in the use of turbojet aircraft would be temporary, for the others would purchase similar aircraft to meet the competitive threat."

"The real world would be that the economic status and prospects of the domestic industry would be considerably less attractive. Certainly there is no reason to expect that the government will subsidize economic competition. The lines, if they come, must be borne by individual companies."

Days Prop Development—He agreed to the airline, airplane and engine manufacturers and the military to do everything possible to accelerate turboprop engine and propeller development and speed some of the latest technical problems involved, such as reliable gear boxes, engine and propeller controls. He also expected



C. R. Smith

for development of a new type high-efficiency propeller capable of absorbing the 5,000-7,000 hp of modern turboprop engines at the 450-500 mph operating speeds of future airliners.

Smith, who is a major general in the USAF Reserve, noted evidence of a recent military trend toward the turboprop, particularly for military transport and reconnaissance, a trend he believed would accelerate development of the turboprop concept.

"These should be available within a few years, turboprop transports suitable for use and present interest for most of the larger inter-transport of tomorrow," he predicted.

Cost for Turboprop—Smith based his case for the turboprop on the following points:

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be required to introduce turboprop-powered airliners into the current airline route pattern.

• **Noise**—The turboprop airliner is a quiet aircraft, both in the cabin and externally. It makes less external noise than current airliners, much less than jets. Industry observers who have seen the performance of the British Viscount and Lockheed and the Alouette turboprops believe the turboprop is an answer to the airport noise problem.

• **Cost**—Combination of high fuel consumption and high development costs combine to make the turboprop transport considerably less economical than the turboprop. Smith cited turboprop development costs as representing \$30 million for the first prototype and \$30 million to \$40 million each for production models.

Attribution of this high cost level over the estimated life of the aircraft will require a much higher monthly charge to operating costs than comparable costs for current airliner or turboprop of the future.

High percentage of useful load devoted to fuel as jet transports reduces their revenue earning capabilities below the danger point.

• **Passenger comfort**—Turboprop transports will produce a 30 to 100 mph increase over the 370 mph, cruise speed of the DC-7 and Super Constellation. This will reflect the eight-hour DC-7 transcontinental time to six hours.

A turboprop could cut this to five hours, but the extra time saved would cost too much to be practical for commercial operations.

Turboprop transports will provide the same type of misadventure, quiet ride that attracts passengers to turbojet transports.

• **Jet Replacement**—"It seems to be," Smith said, "the better course of good judgment to delay adoption of the turbojet airplane until some time later."

It is disappointing that we cannot see a definite trend that it is operating with economic advantage to warrant that it be included in the operating fleet.

"The turboprop trend toward economic advantage and should continue. The long-range potential of the jet powered is so tremendous that it would be unwise to conclude the jet airplane will not have a permanent place in our transportation, but the time for that is more distant than we are able to believe."

New Colombian Fields

(McGraw-Hill World News)

Regatta—Contractors have been signed with one U. S. firm for studies and design of a large international airport at Bogotá and another at Cali.

Airmail Rate Ruling Perils Carrier Profits

If S. government would accept an air line profits higher than 5% in certain post periods if the Supreme Court upholds two demands handed down last week by the Court of Appeals. The decision would not have been possible if the Civil Aeronautics Board in the ruling of mail rates. Appeal to the Supreme Court is certain for both cases.

The court ruled in favor of the Post Office Department against CAB and the two airlines. Specifically concerned—Chicago & Southern (now Delta-S&S) and Western Air Lines.

CAB's international and domestic rates must be considered together by CAB in setting "need" for mail pay under Section 406 (b) of the Civil Aeronautics Act. This means the Board must use a \$600,000 domestic profit as an offset to subsidy used of the company's international mail, even though the domestic mail cost already has been funded by the Board and stockholders consider that profit their and agents.

Western's non-operating profit of \$500,000 on sale of an airplane must, as Route 66, should be included in revenue offsetting the airline's "need" for mail pay from the time of the company's application to CAB to make the sale.

Airmail Service Loss Totals \$56 Million

Post Office Department lost \$32 million on domestic airmail service and \$24 million on foreign airmail in fiscal 1952, according to a cost report released last week.

However, the figures show that before payment of subsidies, Post Office had a profit on airmail.

• **Subsidies to domestic air carrier** for the year totaled \$42 million, \$10 million more than the domestic airmail deficit.

• **Subsidies to international carriers** were \$25 million, slightly more than the foreign airmail deficit.

The report disclosed a big rise in domestic airmail volume and a modest increase in foreign airmail volume. Total domestic airmail revenue climbed from \$95 million in fiscal 1951 to \$128 million last year. Revenue from foreign airmail rose from \$15 million in 1951 to \$18 million in 1952.

Post Office revenue from letters and parcels fell \$500,000, but this was counterbalanced by a \$1.2 million increase in parcel post and other revenues.

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UNITED AIR LINES of Denver is one of the finest examples of such dynamic development. For United began back in 1916 and 1917 when four small independent airlines were formed, backed only by private capital and the mere determination to make a vital new service to the Nation and its economy.

It was then that such pioneering vision as Walter T. Varney, founder of Varney Air Lines, began flying mail from Pikes, Washington to Elko, Nevada in single engine biplanes. Another was Wm. C. Gage, founder of Pacific Air Transport, who with open cockpit biplanes flew the mail from Seattle to Los Angeles in the unprecedented time of 14 hours. With untrained Curtiss Repairs, National Air Transport began regular trips between New York, Chicago, and New York, connecting with the Boeing Air Transport's Chicago-San Francisco run. During those days came to close rivalry over these United Airlines predecessor companies required 30-40 hours!

Today, fifty years after the famous Wright Brothers first flight at Kitty Hawk, North Carolina, United Air Lines serves 81 cities from Boston to Honolulu, from Vancouver to San Diego. United opens the nation daily in only 11 hours with modern streamlined DC-6's!

Thus, on the golden anniversary of powered flight, United Airlines demonstrates the dynamic development of an air line in today's tempo, organization United Air Lines and its management for its contribution in the development and growth of the Nation's air transport industry under the American free enterprise system.

(From a series—Following the Trail of the Pioneer)

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ups.



MASTER PLAN for Los Angeles International Airport features numerous runways and...



DOMED TERMINAL of novel design, with plane loading docks leading out from center

L. A. Airport Expansion Faces Vote

Los Angeles Airport Commission plans to vote on the master plan for the airport in one of the most modern and sub-
stantially designed in the world will be
put to vote May 16 in a \$53,255,000
cost item being presented in the
budgeting division.

The master plan for Los Angeles In-
ternational Airport's expansion has a
Rock Rogers look (see photos above)
and is highly practical, says Francis
J. Lockman, architectural engineering
company.

Rayway Layout—For example, the
master layout follows a modified "A-
to-B" system," named after Civil En-
gineering Administration engineer Hans
Lubig, who initially proposed a "Eu-
ropean" concept plan to place four run-
ways at right angles to each other, fan-
ing out from and reducing the
terminal.

Francis J. Lockman plans to make
loading stages of the field's two present
east-west runways, extending their pres-
ent 5,700 ft length to 10,000 ft. North
of these will be two more 10,000 ft
runways for takeoff. The new terminal
will lie between the two sets of runways.
There will be also \$ 800,700 ft north-

south runways west of the terminal,
crossing the existing stage. The 10-
000 ft runways meet Dodgeville Com-
mission report recommendations.

► Dome Terminal—The dome-topped
terminal is of eye-catching design, and
the architect says the design is in-
spired on the basis of cost, flexibility,
coordination of services and anti-
quake resistance. The shell is to be
pneumatically inflated.

All upper floors will be balconies,
pneumatically inflated from a great central
pilot. Six plane-loading platforms,
each capable of taking 16 aircraft, will
lie out from the central building.

Travel will be broken up into differ-
ent levels. A below-ground level will
contain a car-pool drive-in and limited
parking space. Passengers and baggage
will be carried on escalators to a main
concourse at field level, where ticket
counters, passenger accommodations
and baggage-checking counters will be
located. Upper floors will con-
tain administrative offices, restaurants,
lounges and observation deck. A top
balcony will be the arrival level.

Other features of the proposed air-
port expansion.

- Helicopter landing area.
- Separate air cargo docks, using pres-
ent passenger terminal buildings. Cargo
net would be toward the east end of
the landing concourse.
- A 362-acre consolidated maintenance
area west of the terminal. Airlines
would lease space from the Depart-
ment of Airports and build their own
buildings.
- Rapid Growth—Large airport land
area is not only hard to sell to
others, but the Airport Commission and
other bodies of the present proposal
find there is a good case for a total
favorable change of something.

Traffic growth at the field has been
phenomenal. Since 1947, first full year
of operation, passenger traffic climbed
80% to last year's 2.3 million with ex-
cessive 4-4 million within the next
30 years. Landing and takeoff facil-
ties and the terminal are already
overcrowded. Parking facilities are in-
adequate.

Airport expansion proposals are to
come from the present field service
employees (not including depreciation)
by more than \$500,000 annually. They
estimate this figure will rise to \$15
million yearly after completion of the
new expansion and to \$5 million after
30 years.

The Department of Airports esti-
mates "conservatively" that airport
revenues will provide at least the per-
centage of all interest charges on the local
bonds and nearly \$5 million on the
bonds payments.

UAL Chief Forecasts Post-Korea Growth

Airline forecasts probably would be
affected by sudden end of the Korean
war, United Airlines president W. A.
Patterson says.

He forecasts "continued, normal,
healthy" growth of the airline industry.
If the Korean war should end abruptly,
the estimated 15% "slowdown" de-
manded by the national emergency prob-
ably would be offset by normal increases
within a year," Patterson believes.

He predicts airlines will continue to
generate the first \$100 million market by
2 to 4% a year and, with strength ac-
cruing, also will begin "penetration of the
tourist market."

Patterson spoke at a recent annual
meeting of stockholders, who re-elected
all 30 company directors. They also
approved a plan for granting options
to 150,000 shares of company stock to
"key management employees," replacing
the previous "management stock" pro-
gram.

They declared the regular quarterly
dividends—25 cents a common share
and \$1 125 on cumulative preferred to
holders of record May 15.

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For More Production Forums

The success of the recent Aeronautics Production Forum presented in New York by the Society of Automotive Engineers brings the natural question—why aren't there more such exchanges nationally and in the regions?

Never has the need to promote aircraft production been more acute. Design capabilities have far outstripped ability of production to keep abreast on a reasonable time-and-cost basis. Be that as it may, we are building on new breeds of transonic and supersonic planes and missiles with old methods.

We are taking some important steps in production, but they do not take priority of our toughest fabrication problems. The gains demonstrated in design has not been accomplished in assembly.

Such production forums not only benefit directly those who attend. They offer a sounding board for the various government agencies and coordinating agencies that must keep up with production requirements.

Such forums are also effective media for promoting research contracts in production. Roy Heflin, president of Curtiss-Wright Corp., and speaker of SAE's New York production forum, emphasized that we must spend more time and money in researching manufacturing processes, as distinct from basic or engineering research.

Production forums naturally differ from design meetings in their security problems. After all, you can't keep every secret in shops the size of most aircraft plants. In the final analysis, what secrets are those to be protected? For a time, it is true, there was some effort to keep the heavy press program a secret, but that proved to be totally senseless.

The production forum idea is still new. If there are others, we shall expect more participation by those manufacturers, less hostility, longer sessions on important subjects, fewer meetings held simultaneously, talks with good scientific and well-planned introductions and head-speakers, control of glibness individuals and those dealing in generalities.

Nearly 2,000 aeronautical engineers shared experience, ideas and problems at the forum and technical sessions just closed. It was the largest SAE meeting ever held in New York.

Such technical teamwork among competitors is good for the industry. It is good for the industry's biggest customer, the government, which means all of us taxpayers.

Here, in one SAE official points out, is a constructive reply to congressional committees and critics of military aircraft expenditures.

Here is evidence of earnest effort by industry to pay deficits from production costs despite the growing complexity of military aircraft.

No Need for Panic

Announcement of a reduction of about \$5 billion in the next fiscal year defense budget has resulted in a crop of rash rumors and speculation on the aircraft industry—many of them without foundation and due to a misunderstanding of the ways of Washington fiscal experts.

There is no need for panic or grave concern about any major change in the aircraft program in the near future.

However, up to a few days ago, financial specialists were unanimous in their belief that the cuts that had been announced through midweek for the new fiscal year beginning July 1 will leave the aircraft manufacturing industry pretty much with the same production and earnings prospects for calendar 1953 as before, and there appears to be little likelihood so far of the outlook changing much from previous expectations for calendar 1954.

Most military aviation reductions recently announced are not expected to interfere with 1955, or perhaps even later. There may be some changes later this year if the reduction is around some facilities is carried further.

But there certainly is no reason for panic.

A Surprising Court Decision

The supreme decision of the Federal Court of Appeals last week in directing CAB to consider all income of an airline in establishing rate rules probably will be taken to the Supreme Court.

Thus the effect of the appellate court's determination will not be felt for the time being, but the decision will open a period of uncertainty on a matter that had been well established previously by Civil Aeronautics Board.

On an action initiated by the Post Office Department, protesting CAB's failure to offset earnings from the domestic operations of Chicago & Southern Air Lines in establishing a mail rate for that carrier's international division, the court ruled in favor of the P. O. position. CAB makes the mail rate awards but payment comes out of the P. O. budget.

The court also upheld the P. O.'s contention in that the profit received by Western Air Lines on sale of equipment and a route to United Air Lines should be offset against the latter's annual need.

The ultimate findings of the Supreme Court will have a vital effect on all U. S. airlines that have combined domestic and international routes. This includes Chicago & Southern, Northwest, TWA, and Braniff. Also, it appears that Pan American's various individual route operations may be considered as one for mail rate making purposes.

—Robert H. Wood



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